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THE SCOTTISH GEOGRAPHICAL MAGAZINE

F. B. Sturgard

THE SCOTTISH GEOGRAPHICAL MAGAZINE

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

ANNIVERSARY ADDRESS.

THE UPPER KARUN REGION AND THE BAKHTIARI LURS.[1]

(Read at Meetings of the Society, Edinburgh and Glasgow, Nov. 1891.)

By Mrs. Bishop, F.R.S.G.S.

With a Map and Illustration.)

I will not spend any of the time allotted to me in apologising for my very slender claim to the honour of having been asked by the Council of the Royal Scottish Geographical Society to address you to-night, or in an explanation of how I came to visit a part of unexplored Luristan, or of the circumstances of my journey, but will merely remark that the traveller may consider himself fortunate who finds any portion of Western Asia in which the track has not been previously beaten by geographical research or commercial enterprise.

The subject, however, requires, if not an apology, at least an explanation on the lines which Sir Robert Smith[2] has just indicated. Without one it would scarcely seem fitting that a mountainous region devoid of permanent inhabitants, a river whose abundant upper waters can neither be utilised for irrigation nor navigation, and nomadic and semi-savage tribes, without the instinct of progress, should occupy the attention of this Society at the opening meeting of the session.

The interest attaching to the Bakhtiari country and its people is, in the first place, one of pure commercial selfishness, or, as it may be

[1] The Editors are indebted to Mr. John Murray, of Albemarle Street, London, for the use of the accompanying sketch-map of the Bakhtiari country and engraving of the reputed source of the Karun River, taken from Mrs. Bishop's recently published work, *Journeys in Persia and Kurdistan.*

[2] Sir Robert M. Smith presided over the Anniversary Meeting.—Ed.

stated, of lofty commercial ambition, and, in the second, is connected with certain political contingencies.

The concession made by the Shah of Persia in 1888 of the free navigation of the Karun as far as Ahwaz, and the subsequent permission to run steamers between Ahwaz and Shuster have hitherto been nearly barren of practical results, and, in the meantime, Russia, our great commercial rival in Persia, has been making use of her advantages of proximity to extend her commerce in every direction, to such an extent that on my Persian journey of about 2000 miles, there was seldom a hamlet or camp, however remote from the great caravan routes, in which her wares were not to be seen.

It is easy to circumvent the rapids at Ahwaz, but not so easy to surmount the huge barrier of the Bakhtiari Mountains, an obstacle which cannot be turned, and to ensure the safety of caravans from the attacks of the predatory hordes of the Feili Lurs. Several Indian officers, General Schindler of the Persian service, Mr. Baring, Mr. Blosse Lynch, and Mr. Mackenzie, have traversed and described some of the great passes by which the Iranian plateau can be reached from Shuster; but in spite of hopeful reports and the proffered co-operation of a predecessor of the present *Ilkhani* of the Bakhtiaris, it was obvious to the practical commercial mind that passes varying in altitude from 7000 to 11,500 feet, and blocked by snow for three or four months of the year, could never form a highway for British goods.

These elevated routes have lately lost their importance in consequence of a concession granted to an English company to construct a cart-road from Ahwaz to Burugird through the Gap of Khuramabad, the highest altitude on which will not be much above 5000 feet. This road is to be completed in two years, and, if the Persian Government shows itself capable of keeping the predatory tribes in order, a new era for British commerce in Persia may be confidently expected, and British goods, no longer handicapped in the race with Russia by the horrible rock ladders of Shiraz and the exactions and obstructions of Turkish officialism on the Baghdad and Trebizond routes, will reach the great distributing-centres of the interior by easy land and water carriage, through Persian territory solely. May this peaceful rivalry with Russia be the only one in which Britain will ever be engaged!

The second point of interest is that more than one careful writer has expressed the view that, in the event of certain contingencies, ten or twelve thousand Bakhtiari horsemen might prove valuable auxiliaries to a British force, and such contingencies are to the Indian official mind quite within the region of "practical politics." The Bakhtiari chiefs profess great friendliness for England, but, without trespassing on the domain of *les hautes politiques*, I may say, from what I have seen of them, my own opinion is that, if a collision were to occur in South-West Persia between two powers which shall be nameless, the Bakhtiari light horsemen would be sold to the highest bidder.

Three British officers, General Schindler, and two pioneers of commercial enterprise, were my predecessors over some of the earlier portions of the route: Mr. Stack, of the Indian Civil Service, previously reached

the reputed source of the Karun by a shorter cut from Ispahan, and Sir H. Layard and Sir H. Rawlinson, although they touched the route now to be described only at Khuramabad, turned the light of modern research upon the Bakhtiaris in their winter homes in Khuzistan. The greater part of the route taken by the small party which I joined was previously, so far as is known, untraversed by Europeans.

We left Julfa at the end of April of last year, my section of the caravan consisting of my own saddle-horse, four mules, carrying besides my Persian cook, Indian interpreter, and ordinary baggage, three tents and provisions for forty days. I carried letters from the *Amin-es-Sultan*, the Persian Prime Minister, to the *Ilkhani* of the Bakhtiaris and others, which were to secure a safe-conduct and escorts through the country, but the prophecies of the reception to be met with were of the most doleful description.

The route taken lay through the fertile valley of the Zainderud, with its 300 villages, each village an oasis, and each oasis a paradise as seen in the first flush of spring, and over the Kahva Rukh Pass into the Chahar-Mahals, a district sprinkled with Armenian and Persian villages, under Bakhtiari rule, but geographically Persian.

There, while camped close to the village of Kahva Rukh, on a bright moonlight night, I had a specimen of the dexterity of Persian thieves, followed by an illustration of the celerity of Bakhtiari justice, for I was robbed of the money for a four months' journey, being left literally penniless, but in one week the money was restored by the *Ilkhani*, the feudal head of the Bakhtiaris, having been levied, according to their custom, on the village where the robbery occurred. The thief, when caught, was liable to have either his right or left hand cut off, the choice as to the dismemberment being referred to me.

Crossing the Kuh-i-Sukta range by the Zirreh Pass, at an altitude of 8300 feet, in deep snow, the Bakhtiari country proper was entered: *i.e.* that region of mountainous Luristan in which the powerful nomadic Bakhtiari Lurs have their summer pasturages—a region of lofty ranges, of deep valleys and gorges through which abundant waters take their impetuous course, of dark forests and grassy uplands, of blood-feuds and tribal wars, and of pastoral clans moving with great flocks and herds.

Journeys of forty-six days over wastes of snow, and of eighteen over wastes of gravel, enhanced the charm of the wild nomad land as seen from the crest of Zirreh. Far below lay the deep valley of Seligun, where long grass and ranunculuses rippled in waves of steel and gold, and a million corollas in the glory of their brief but passionate life drank in the sunshine. Emerald lawns starred with white tulips sloped upwards till they met the snows; twin lakes brought the blue of heaven down to earth; the *Fritillaria imperialis* stained the hill-sides terra-cotta and crimson, and the enchanting picture was set in a frame of mountain ranges glorious in unsullied snow.

Crossing the Naghun range, we descended on the great Ardal plateau, on which the *Ilkhani* has a spring residence, half fort, half caravansary, and after spending a week in making the acquaintance of the leading

Bakhtiari chiefs, arranging for supplies, etc., some time was spent in tracing the course of the Karun from its departure by a huge chasm from the Ardal plateau to its arrival at Dupulan, below which point its singular windings have been repeatedly investigated. Several of its larger affluents, notably the Sabzu, were followed up to their sources, and the great ranges of the Kaller-Kuh and the Sabz-Kuh were traced to their joint termination in the gigantic headland of Sultan Ibrahim, which, from an altitude of 12,000 feet, looks down upon the great plain of Khana Mirza, on which are 100 villages of the Janniki tribe, a rare instance of the nomads betaking themselves to a settled life.

Descending upon the plain of Gandaman in the Chahar-Mahals by the pass of Wastagun, and re-entering the Bakhtiari country, we spent ten days on the elevated plain of Chigakhor, the summer camping-ground of the *Ilkhani* and of the *Ilbegi*, the second in command, and the summer centre of Bakhtiari life. About that time the *Ilkhani* plotted the destruction of the *Ilbegi*, and their rival retainers were on the verge of war. In no other way than by the difficulty which both felt in dispensing with the services of any of their horsemen under such critical circumstances can the fact be accounted for that the orders of the *Amin-es-Sultan*, which represented those of the Shah, were disregarded, and that we were left to make our way from Chighakhor to Khuramabad without any escort at all, though such a proceeding had been pronounced absolutely impossible, both at Tihran and Ispahan. The *Ilkhani* is reported as having said on another occasion that "an Englishman under the cloak of a merchant was apt to conceal the uniform of a soldier." Later we were joined by Haidar Khan, a petty chief, who was useful in obtaining guides and supplies. Owing to this crooked dealing on the subject of escorts, we were considerably robbed, and were exposed to many risks, such as being fired on by bodies of tribesmen; and I brought little besides my life out of the Bakhtiari country. Starting a second time from Ardal for a journey chiefly in the region of the Upper Karun and its affluents, the Karun was traced, wherever the nature of its bed admitted of it, from Ardal up to the Sar Cheshmeh-i-Kurang, its reputed source, a noble fountain spring at an altitude of 8000 feet on the side of the magnificent Zard-Kuh range, and afterwards to what was proved to be its actual source, considerably higher, in the Kuh-i-Rang mountain.

The Karun was found, even from its birth, to be a formidable river, from 50 to 100 yards in width, fordable only close to its source, and that only in dry seasons; its full, deep, peacock-green waters flowing majestically between banks ofttimes nearly perpendicular, from 1000 to 3000 feet in height, and cleaving mountain ranges whose snowy summits attain altitudes of 12,000 and 13,000 feet.

At one point, the Karun, after pursuing "the even tenor of its way" with a width of fully 100 yards, is contracted between high conglomerate cliffs to a narrowness of 9 ft. 6 in., where it is bridged by the Pul-i-Alikuh, a cradle of boughs full of stones. Elsewhere on its upper course pointed stone arches are occasionally thrown across it. Its passage through the mountains is marked by prodigious sinuosities. It takes 250 miles to run from its source in the Kuh-i-Rang to Shuster, a direct distance of

THE REPUTED SOURCE OF THE KARUN.

only 75 miles. The well-known branches of its principal affluent, the Ab-i-Diz (the Kamandab and the Ab-i-Burugird), were found to yield in importance to two previously unexplored branches, the Gokun and Guwa ; one of which drains the Persian district of Faraidan. The Abi-i-Diz is a very important river, both as to the size of its tributaries and the area which it drains before it unites with the Karun at Bandikir. One of its head-waters rises in the Kuh-i-Rang, and there also is found the source of the Zainderud, or River of Ispahan, which was formerly placed in the Zard-Kuh range.

The conjectural altitudes of a region previously untraversed by Europeans were brought down by some thousands of feet, a summary process which involved the disappearance of the eternal snows with which rumour had crested them, and fabulous heights were compelled to descend to modest elevations probably nowhere much exceeding 13,000 feet.

The great ranges of the Kuh-i-Sukhta, the Kuh-i-Girreh, the Sabz-Kuh, and the Kuh-i-Rang were crossed and recrossed by passes from 8,000 to 11,000 feet in altitude, by sheep and goat tracks often so ledgy and rugged as to justify the muleteers in declaring that "since the world was made laden mules had never been taken over them." Many of the mountains were ascended, and the deep valleys between them, with their full-watered peacock-green or peacock-blue streams, were followed up wherever it was possible to do so. A lake of marvellously coloured water, something under three miles in length and a mile in width, of prodigious depth, and with a persistent level, was found to occupy a hollow at the inner foot of the Shuturun-Kuh, and, being without a native name, was marked on the map as Lake Irene.

The accompanying sketch-map (for the materials for which I am indebted to the Indian authorities) represents an area of 15,000 square miles, lying, roughly speaking, between 31° and 34° of north latitude, and between 48° and 51° of east longitude. The distance between Khana Mirza in the SE. to Khuramabad in the NW. is about 300 miles. The distance actually travelled was about 700 miles.

I will now ask you to give your attention to the Kuh-i-Rang or "Variegated Mountain," which is in many respects the most important point on the map. It is not only the greatest group of peaks in the Bakhtiari country, and the parent of three of Persia's most important rivers, but it stands there as a huge knot, demarcating two distinct systems of drainage, "and coincidently forming the boundary of two ethnographical areas," that to the SE. having been termed by a competent authority, the "Bakhtiari Country," and that to the NW. "Upper Elam." By the same authority, for the purpose of convenient reference, the range which descends upon the Iranian plateau, and which is pierced by two *tangs* or rifts, one for the exit of the Zainderud towards Ispahan, and the other for the ingress of the Darkash Warkash, which brings the drainage of an area of 2500 square miles in the Chahar-Mahols to join the Karun, was termed the "Outer Range ;" and the range which eventually descends upon the plains of Khuzistan, and is pierced for the exit of the Karun at Dupulan, was termed the "Inner Range."

From the map it will be seen that the Bakhtiari Mountains are mostly parallel ranges, running SE. and NW., the streams which carry off their waters flowing through valleys which have the same direction. It is a land of walls and clefts, but the formation is orderly and intelligible.

At the Kuh-i-Rang, however, a change takes place, and the rivers, instead of running parallel to the main ranges, cut them across at short intervals. By this means Nature arbitrarily alters the characteristics of travel. Up to this point the tracks, such as they are, follow the valleys by easy gradients; beyond it the traveller is confronted by innumerable and horrible ascents and descents of three, four, and even five thousand feet, and by deep and rocky fords.

It is only possible to pass from the Bakhtiari Country to Upper Elam by two passes, both over 10,000 feet in altitude, one to the north, the other to the south of the Kuh-i-Rang; but the tribesmen seldom, and then only in armed companies, run the risk of crossing either of them. This mountain also divides the drainage-areas of the Karun and the Ab-i-Diz. I may add that, up to that point, the nomads had been, on the whole, friendly—beyond it they were suspicious and occasionally hostile.

The parallel ranges, specially the Zard-Kuh, have a continuity and steep-sidedness beyond all conception. They are rarely broken up into peaks, the Kuh-i-Rang, the Kuh-Shahan, and the Shuturun-Kuh being separate mountains. Fair, flowery alpine plateaux occur at great heights, and the wider valleys are both pastoral and arable. Much of the region, including the whole of the outer slopes of the "Outer Range," is absolutely treeless, producing nothing fit for fuel except two species of *astragalus*, which under the wastefulness and destructiveness of savage life are growing scarcer every year. But in many places, from the long crest of the Outer Range to the outer slopes of the Inner Range, there are extensive forests of small trees, consisting mainly of a wizened oak, the *Quercus ballota*, which produces acorns three inches long, largely used for food, and the pear, cherry, walnut, jujube, and willow.

The flowers of the country are innumerable, and include many medicinal herbs. Among the economic plants are the *Centaurea alata* and *Eryngium cœruleum*, invaluable as fodder, a gigantic species of celery, which furnishes food for man and beast, the *Ferula asafœtida*, the blue flax, and liquorice root. Among 300 plants which were collected, many are said to possess great botanical interest.

The country appeared poor in minerals. In one place a substance which burned freely in the camp fires—but whether coal or bituminous shale is for the geologists to decide—was found in abundance; there were suggestions of iron; bituminous limestone occurred frequently; and close to the Ab-i-Diz, at the lowest altitude touched on the journey, there were some insignificant bitumen springs. Gypsum is abundant, and salt streams as well as salt springs occur. I heard of deposits of sulphur used by the natives in making gunpowder, but did not see them.

The climate is superlatively healthy. There are no malarious swamps, and the water is usually pure. The heat begins in early June, and lasts till the end of August, during which period the mercury frequently

touched 100° in the shade, even at altitudes of 7000 feet; but the nights are cool, and greenery and abounding waters are a refreshing contrast to the verdureless hills and arid plains of Persia proper. I should think that the rainfall is scarcely measurable. The snowfall is apparently excessive, and the winter temperatures are presumably low, but I refrain from hazarding any conjectures on either.

The *fauna* appears very limited, and game of all kinds very scarce.

There are few indications of ancient history, and the tribal legends are too hazy and scanty to be of any value, but in "Upper Elam" there are remains of well-built bridges of hewn stone, and of at least one ancient road, which must have been trodden by the soldiers of Alexander the Great and Valerian, and it is not improbable that the rude forts which occur here and there, and which the natives attribute to mythical heroes of their own race, may have been built to guard Greek and Roman communications.

I need scarcely apologise to the members of a Geographical Society for the length to which my geographical notes, brief and scanty as they are, have run. They are intended to convey an idea of a rugged and uplifted region, of lofty ranges, peaks, and precipices; of watered valleys and alpine pastures; of torrents thundering through sunless rifts, and of untenanted forests on vast hill-slopes—the summer country of the Bakhtiari Lurs, the grand stage on which these nomad players fret out their little lives, leaving scarcely a trace behind.

In early May the traveller, passing through what at that time is an absolutely lonely land, is astonished to find villages and hill-slopes covered with grain crops and intersected with irrigation ditches, not here and there, but wherever water is procurable, and he naturally asks, "Where are the sowers and the reapers?"

The answer comes in the middle of May, when every track leading up from the warm plains, which are the winter camping-grounds of the tribes, is a thronged highway, up which, in endless procession by day and night, stream sheep, goats, cattle, big dogs, mares with foals, fowls tied by one leg on donkeys' backs, men with long guns, women, and children, small oxen and asses laden with household goods, tents of goats'-hair cloth, and all the paraphernalia of nomadic life in copper, wood, and leather, the only materials which bear the strain of such an existence. By the first of June the valleys and hill-pastures are peopled; every plateau and ravine has its village of tents, and at night the camp-fires gleam like the lights of cities. Estimates of the population vary very widely, but taking my own, made with much care from data furnished to me by the khans, I should say that by the middle of June nearly 200,000 people have spread themselves over the country, to migrate southwards in October, sowing the grain before they depart, and reaping it in the following summer. The land, "which is as the garden of Eden before them, is behind them a desolate wilderness;" every stalk of herbage has disappeared, and were it not that on their upward march they cut and stack the *Centaurea alata* and the great celery leaves, their flocks and herds would perish on the return journey.

The Bakhtiari Lurs have made these two annual migrations from time

immemorial, and the only roads are the tracks which have been worn by the passage of their flocks and herds. Their camping-grounds are strictly defined by tribal custom, and each camp comes up with its *ketchuda* or headman and social organisation complete, taking up its position like a division of an army.

It had been said in Tihran and Julfa, by the only people who were supposed to know anything about the Bakhtiaris, that it would be absolutely impossible for a lady to travel among them without meeting with insult, and that my presence would produce complications and difficulties. It was owing chiefly to the goodwill and approval of the British Minister in Tihran that I was permitted to undertake the journey, and that only on the understanding that, if any of the troubles occurred which were predicted, I should return to Ispahan at once.

I may here say that not one of these prophecies was fulfilled. I was robbed, it is true, but never met with any rudeness or insult; and great as must have been the curiosity to see the first European woman who had penetrated these mountain fastnesses, not a Bakhtiari man or even boy ever raised the curtain of my tent.

The chief interest of the country to me was its people. On the journey nearly every tribe was visited in its own encampments, and my evenings were usually spent in learning from the people their customs, beliefs, and habits. It is with humble apologies to the members of the medical profession who are present for an intrusion on their province, that I confess that, in virtue of a medicine-chest presented to me by Messrs. Burroughs and Wellcome, a few surgical appliances, and a little elementary experience, which, aided by considerable faith on the part of my victims, had wrought some cures, the servants had bestowed on me the title of *Hakīm*, and the fame of the Feringhi *hakīm* soon spread among the tribes, bringing crowds of "patients" to my tent during all the hours of daylight. The "leather box" became famous; rumour, indeed, invested it with a gold key, and it was believed to contain not only specifics for all ailments, but love-philters, and potions for rendering favourite wives ugly and odious. I mention it, chiefly because it not only brought me much goodwill, but into friendly and familiar contact with the people—so friendly, indeed, that I was frequently urged to stay among them to teach them "the wisdom of the Feringhis," and cure their mares and mules as well as themselves.

On the whole they took the medicines with much docility, except in one or two cases where they said that they wanted "Feringhi ointment," but "nothing that went down the throat," some saying that I should poison them, others that anything they swallowed "would make Christians of them." The distribution of eye-lotions and medicines was beset with difficulties. Of course they had no medicine-bottles, and very often a copper jug holding one or two gallons was brought for an ounce of eye-lotion, while the very poor with much complacency produced egg-shells for the same purpose. I generally felt convinced that the eye-lotions would be swallowed, and that the medicines would be put into the eyes. Some would not take medicine from a *Kafir's* hand without purifying the cup first by rinsing it with water in which a verse from the Koran was steeped.

The Bakhtiaris are a very healthy people. None of the dreadful diseases common among the Persians afflict them, and consumption seems unknown. Their chief maladies are dyspepsia, rheumatism (wind in the bones), headaches (wind in the head), epilepsy, of which they have no horror, ophthalmia and its results, and a few simple skin-diseases, the result of want of cleanliness. Nevertheless, longevity, as we understand it, seems unknown, and a man of sixty is "very old indeed."

They know nearly nothing of the virtues of their medicinal herbs, though for wounds they use an astringent paste, made of a small gall-nut powdered. To snake bites they apply the intestines of a newly killed goat, and keep the bitten person moving about. For dyspepsia and rheumatism they sew the sufferer up in the warm skin of a newly killed sheep; for deafness the ears are filled with warm blood, or the deaf person drinks warm blood taken from behind the ear of a mare; and they fill the nostrils of the dying with a paste made of moist mud and a powdered aromatic herb. I did not see any Bakhtiari doctors, so the "leather box" was not the cause of any unpleasant rivalries.

At Chigakhor a chief of Janniki tribe came to my tent to ask me to go with him a three days' journey, to cure his wife's eyes. He had brought baggage and saddle-horses, a tent and escort, and said that I should have neither expense nor risk if I would go. He was greatly disappointed when I told him that from his description of the symptoms his wife's eyes were far beyond my simple remedies. A question he asked led to Christ the Healer being mentioned, on which he became very thoughtful, and after a time said, "You call him Master and Lord: He was a great prophet, *send us a hakīm in His likeness*,"—the briefest and best description of a true medical missionary which was ever given.

The Bakhtiaris, though they speak a dialect of Persian, disclaim Persian origin, and assert that they came from Syria. Physically they are a very fine race. In the course of a summer, I never saw among them a dwarfish, deformed, or idiotic person. The height of the men is from 5 ft. 6 in. to 5 ft. 10 in., of the women from 5 ft. 2 in. to 5 ft. 6 in. The measurements of forty adult male heads, taken at random, give an average circumference of $20\frac{8}{10}$ in. and over the arc from ear to ear of $11\frac{1}{10}$ in. The complexions are not darker than those of the nations of central Italy. The eyebrows and noses are straight, the eyes and hair dark, the mouths wide, the lips thin, and the chins long. The foreheads are broad and well developed, the ears are small, the teeth small, white, and regular, the men's beards are full, and the hair of both sexes is straight and abundant. The men are fairly good-looking, and there are few women who have not narrowly escaped being handsome. All are well made, and walk with a firm elastic stride.

The male costume is that of the Persians. The women wear full trousers drawn in at the ankles, short loose jackets, and handkerchiefs pinned to their hair, which is usually jet-black, and well cared for, the application of a paste of powdered henna leaves, succeeded by one of indigo every twenty days, replacing the natural tint by a blue-black tinge. Both sexes are civilised enough to be clothed in Manchester cottons.

The Bakhtiaris are polygamists, and both Negro and Persian women

are found in their households. Among the peasantry of Persia and Turkey poverty brings with it the blessing of monogamy; but among these pastoral tribes the labour of women is essential, and as it is "contrary to Bakhtiari custom" to employ female servants who are not wives, a man, however poor, is usually the husband of three or four women.

The higher chiefs, who have been in Tihran, follow Persian custom and seclude their women so far as is possible; but the wives of the ordinary tribesmen are neither secluded nor veiled, and have a good deal of "say" in the camps. They perform the harder and larger part of the work. The men beat them when they are angry with them, and when they got in their way or mine they kicked them out of it as unscrupulously as rough men kick their dogs under similar circumstances; but otherwise they are not badly treated, and the birth of a girl, though not the occasion of festivities, is cordially welcomed. Infanticide is unknown, and the rate of infant mortality appears to be very low. The Bakhtiaris have strong parental affections, and tenderness to their children is among their best points.

The women pitch and strike the tents, milk the sheep, goats, and cows, churn, clarify butter, attend to the young of the flocks and herds, cook, draw water, and weave rugs and cloth of goat's hair. It is to the credit of these nomads that a woman can traverse their country unattended, and is always and everywhere safe even during the fiercest inter-tribal conflicts.

Their tents are usually mere open-sided canopies, in which privacy is unknown. They are pitched in groups, rows, circles, semi-circles, and streets, according to the size of the camp. Bakhtiari wealth is pastoral; the intermittent agricultural pursuits are of recent origin. The Bakhtiaris live on the produce of their flocks and herds, with the addition of leavened cakes made of wheat and acorn flour, and the huge underground stems of the wild celery, both fresh and pickled in sour milk.

They not only sow and harvest crops, but, nomadic and semi-savage as they are, they weave carpets of dyed wool in artistic patterns, and make goat's-hair tent-cloth, rugs, horse furniture, and socks of intricate designs, and understand to some extent the advantages of trade, exporting not only colts, mules, and sheep, but manna, gall-nuts, charcoal, clarified butter, and cherry sticks for pipes. But on the whole they appeared very poor, and under the tightening grip of Persia, which means to them increasing exactions and misrule, they seem to be growing poorer every year.

The legitimate tribute paid through the *Ilkhani* to the Shah probably averages 15 shillings per tent annually, but all the Khans complained that the life is being crushed out of the people by the merciless exactions of the provincial authorities. They agreed in stating that when they decline to pay more than the sum fixed by the *Amin-es-Sultan*, troops are sent among them, who drive off the mares, flocks, and herds, to the extent of many times the sum demanded. A tribute insurrection on a larger or smaller scale is a recurring autumnal event. The tribesmen complain to some extent of the exactions of their chiefs, and the statements of the Khans may be true in part only; but a report to the Foreign Office presented to

Parliament in the spring of 1891 gives an official stamp to accounts of precisely the same extortions practised upon the Feili Lurs. The infamies of Turkish administration are undoubtedly repeated by Persia in her western provinces, and, under a system which in plain English is execrable, the Bakhtiari Lurs and the Persian peasantry occupy much the same unenviable position. They are alike the ultimate sponge to be squeezed by all above them. Every official squeezes the man below him, and the highest are squeezed by the Crown.

The various Bakhtiari tribes are ruled by hereditary Khans, who are supreme within certain limits, and beneath them are the headmen of camps, who are or ought to be elective. Some years ago the Khans, for mutual protection, agreed to become united under one head, the *Ilkhani*, who is appointed by the Shah, and who is responsible for the tribute and for the good order of the region. This arrangement sounds well, but it must be a strong man indeed who could coerce these wild armed clans. The recent *Ilkhanis* have not been strong men, and the tribes are in a constant state of embroilment. Certain of them are predatory by tradition and habit, and probably there are few among the Bakhtiaris who would hesitate to deprive a Kafir of his goods if a favourable opportunity presented itself.

Justice is in a rudimentary state, and is executed by the *Ilkhani* and the Khans. Punishments are retributive and deterrent. Robbery from a guest of the *Ilkhani* is punishable by branding or by cutting off a hand; a man-killer under certain circumstances is handed over to the relations of the slain person, who may kill him, pardon him, or exact blood-money; and a faithless wife is punishable with death.

The Bakhtiari Country is pre-eminently a country of "blood-feuds," and they create one of the difficulties of travelling, for at critical moments the guides decline to proceed further, saying that they have reached the boundaries of another tribe between which and theirs "there is blood." These feuds are created in various ways, and are of three kinds. In the first, if there is blood between one tribe and another, it is lawful for a man of the one to kill a man of the other wherever he finds him; in the second, the foemen only drive off each other's cattle and harry each other's goods; in the third, "boycotting" is resorted to—that is, supplies and passage through the territory are refused to men of the other tribe, who, to quote a famous phrase, are let "severely alone." These feuds are a heritage which descends from generation to generation, and involve annually a considerable sacrifice of life.

The men are expert horsemen and capital marksmen, though they are armed only with Persian smooth-bore guns, very long, some of them being matchlocks of an antique pattern. A few of the Khans possess British rifles, and carry revolvers in addition, but many of their followers fight with long knives and clubs or loaded sticks only. The Bakhtiaris love war; their talk is of guns and warlike exploits, and intertribal fighting is continually going on. We came into contact with it more than once after passing the Kuh-i-Rang. Among the spurs of the Shuturun-Kuh I witnessed parts of a battle between two tribes, which lasted the whole of a long summer day; but though considerable

bodies of men were engaged, and the firing was incessant, and the war yells gave the impression of extreme ferocity, only a few men were seen to fall. There was scarcely a camping-ground in which bullet-wounds were not brought to me in my capacity of *hakīm*, and I was not a little surprised at the readiness with which men sought the aid of so inferior a being as a woman, till I learned that almost the only doctors among the Bakhtiaris are women, some of whom have great repute as bullet extractors.

The desire for the acquisition of European fire-arms, and the general readiness with which the tribesmen use their own, brought us into serious peril, and on two occasions we narrowly escaped with our lives. On the second, we were riding up a slope of the Kuh-i-Parwez, with the caravan a short distance in the rear, when, after some suspicious circumstances, a crowd of tribesmen crowned the crest of a low pass which we had to cross, and fired upon us. Seeing our assailants re-loading hurriedly, we scattered a little to the right and left, but continued to ride slowly forwards. Then there was a second volley—so well directed that some of the bullets whistled over us and struck the ground among us. A bullet from an English rifle, fired over the heads of the Polar-wands made them pause, and Haidar Khan, our sole attendant, rode slowly up the hill under the muzzles of thirty guns to parley with them.

The affair ended well, but had blood been shed on either side, and had one of us been killed, it would always have been supposed that some provocation had been given on our side. Some of the men who fired on us came to my tent in the evening for eye lotion, and when I asked them what they meant by the attack, they first said that they thought we were going to assail their camps. To another they said that they took us for Hadjwands (a hostile tribe); but when it was demonstrated to them that Hadjwands do not ride on English saddles, or carry white umbrellas, or travel with Persian muleteers, they changed their ground again, and to me said that if they had known that I was a *hakīm* they would not have fired. I believe that the truth was, that if we had turned, or had shown the white feather in any way, as they expected, they were prepared to double up our caravan between two parties, and rob it at leisure of the fire-arms and ammunition which it was supposed to contain.

I must now content myself with a hasty glance at their religion, though their marriage and funeral rites, and some of their other customs, present peculiarities of an interesting kind. On the subject of religion the Bakhtiaris were on the whole tolerably communicative, except when the women said, "We have no religion, for we shall not live again," or when a man would stalk contemptuously away, saying, "What can a Kafir know of God?" I asked an intelligent man if he thought a *Kafir* could reach Paradise. He replied, "Oh no!" very hastily, but after a minute's thought, added, "I don't know; God knows. He doesn't think as we do. He may be more merciful than we think. If *Kafirs* fear God, they may have some Paradise to themselves; we don't know;" but on another day the same Khan asserted dogmatically that "it is impossible for a *Kafir* to perform a good action."

The Bakhtiaris are nominally Moslems of the Shiah sect, and though not *Ali-Ilahis* like their neighbours, the Feili Lurs, they regard Ali as second to Mohammed, if not absolutely his equal. They hold the unity of God, that Mohammed is his prophet, and Ali his lieutenant. They are grossly ignorant and fanatical, and their religion really appears to be a combination of a few of the tenets of Islam with relics of a rude Nature-worship.

They regard as sins cowardice, conjugal infidelity, disobedience to a chief, disrespect to a parent, betraying a man of their own tribe to an enemy, or compassing the death of a fellow-tribesman by poison.

Cowardice, the greatest crime which can be committed, is regarded as the result of possession by evil spirits. Medicine is not resorted to, but a *mollah* writes a verse from the Koran and binds the paper on the coward's arm. If this proves unsuccessful, he must visit a graveyard on the night of the full moon, and pass seven times under the body of one of the sculptured lions on the graves, repeating an Arabic prayer. They regard as virtues courage, revenge, chastity, charity to the poor, readiness to fight in a tribal quarrel, and undying hatred of the Khalif Omar, and of all Sunnis and *Kafirs*.

Their idea of a future state is that the soul goes to heaven or hell, or into an intermediate state known as *Bardjeskh*, where those who have died in sin undergo a probation with a possibility of a fortunate result. They think that death in battle ensures an immediate entrance into Paradise, and thus they dance the *chapi*, their national dance, round a fighting-man's grave, and rejoice with music and songs. A few of them professed beliefs regarding the future of the spirit, which involve progressive beatitudes during a period of a century. Haidar Khan was explaining these to me in detail one day, when a Magawe man broke into the conversation indignantly, saying: "Haidar Khan, how can you speak thus? These things belong to God, the judge. He knows—we don't. We see the spirit fly away to judgment, and we know no more. God is great. He alone knows."

The Bakhtiaris regard certain places as possibly haunted by spirits, always evil, and never those of departed persons, but this opinion is not influential enough to produce fear. They look upon certain trees, stones, and hill-tops as sacred, but the ideas attached to them are absolutely indefinite. I am inclined to think that they regard them as the abodes of genii, always malignant, and requiring to be propitiated. In passing such places they use the formula, "May God avert evil!" and it is customary to hang pieces of rag on such trees or rocks apparently as offerings to the *genius loci*. They have implicit faith in astrology, and certain omens, denoting lucky days or the reverse, and rely on charms and amulets, and on the efficacy, in some maladies, of swallowing verses of the Koran, but they have no belief in witchcraft.

They concern themselves about the requirements of religion and the future of the soul as little as is possible. They have no mosques in their few villages, and rarely observe the hours of prayer, except in the case of Hadjis, who repeat some of the Arabic prayers with which as pilgrims they circled the *Kaaba*, one or two of which, with a single omission, we

as Christians might reverently use, such as the following:—"O God, shade me with Thy shadow in that day when there shall be no shade but Thy shadow, and give me to drink a draught from that cup (of Thine apostle Mohammed; may God bless and preserve him!), after which there shall be no thirst for all eternity."

They regard God chiefly as a personification of Fate, to which they must bow, and as a judge to whom in some mysterious way they must account after death. On being asked if they thought that anything could affect the decision of the judge in case it should go against them, they usually replied in the negative; but a few said that Ali, the lieutenant of God, would intercede for them, and that his intercession would be successful. Of God as a moral Being, or as an object of love, they have no conception. In a vague way they attribute both omnipotence and omniscience to the Creator, but of moral requirements on his part, or of sin as the violation of any laws which he has laid down, they know nothing. Death, except in battle, is an object of dread to them; none enter the dark valley in which the footfall of the king of terrors drowns the familiar sounds of earth, without anxiety, and a camp removes instantly from the ground where a death has occurred.

And thus they pass away, generation after generation, to sleep under rude stone lions carved with the instruments of war, in ignorance of the fatherhood of God and the brotherhood of man—of that love to God and man in which alone lies "the fulfilling of the law," and of that light which He who is the resurrection and the life has shed on the destiny of the human spirit.

Savage or semi-savage life is only enchanting when seen from a distance; and the life of the Bakhtiari Lurs, little raised as it is above the necessities of animal existence, with its total want of privacy, its fearful noise, its dirt, its rivalries, jealousies, and bloody feuds, and its greed and cunning, is not an exception to the rule. But I prefer to think of their savage virtues rather than of their savage vices, of their free and breezy life, of their family affection and tribal loyalty, of their tenderness for infancy, and their reverence for age, and to forget their treachery and double-dealing in the remembrance of Haidar Khan, unflinching in his courage and unswerving in his fidelity, from whom, after months of difficulties and risks, I parted with real regret at Burujird.

THE PAMIR: A GEOGRAPHICAL AND POLITICAL SKETCH.

By E. Delmar Morgan.

(*With a Map.*)

Recent events have lent an importance to the geography of the Pamir hardly inferior to that excited a few years ago by the Russo-Afghan frontier lands further west. When the Cossack and the Sepoy met on the classical grounds watered by the Heri-rud, and the Murgh-ab, there was a general belief that war between Great Britain and Russia was inevitable, for it seemed then as if the Russian military expeditions, flushed with their easy, though not bloodless, conquest of Turkestan, had ventured further south than they should have done, and were menacing States and people dependent on Britain. The long-foretold day seemed come when the rival powers were to measure their strength on the plains between the Indian Caucasus and the Oxus.

That no actual hostilities took place was due to the desire for peace of the Tsar, the forbearance of our officers, and to diplomacy. An international Commission was appointed to fix a boundary-line, final negotiations were carried on at St. Petersburg, and a treaty signed.

But the danger of a collision on the Pamir were then left out of consideration, as being too remote to cause anxiety. A table-land rising to an average height of about 13,000 feet above sea-level was supposed to afford an insuperable barrier to the invader; India, it was thought, could not possibly be approached by an enemy from that side, and all danger might be considered *nil.*

It is but a few years since the Anglo-Russian treaty was signed, and the Pamir is now the debatable land, a question as pressing as Herat and Badghiz were then. Hardly a day passes but that some disquieting news reaches us. Now it is a Russian expedition that has crossed it, and been refused admittance into Indian territory; now English officers are summarily arrested by orders of the Russian Governor-General and carried off as prisoners; lastly, a conflict has taken place between our Anglo-Indian troops and the mountaineers of Gilghit, a valley near the southern foot of the Hindu-Kush.

In view of all this, let us glance at the Pamir in its physical and political aspects in order to enable our readers to form an opinion on the position of affairs.

When the late Colonel Sir Henry Yule wrote his instructive introductory essay to Wood's *Journey to the Source of the Oxus,* the facts he had to depend on were very meagre, though his learning enabled him to fill in gaps and present us with a fairly complete picture of those regions, far in advance of anything of the time. His essay was translated into Russian by Madame Olga Fedchenko, and edited by her late husband, the well-known traveller, with annotations founded on personal knowledge and the observations of other Russian savants and travellers. Nearly twenty

years have elapsed since then; and, as expedition after expedition advancing from the Russian side crosses and recrosses all parts of the Pamir, this region begins to be as familiar to us as though, instead of being in the heart of Asia, it were within easy reach. The mystery and romance surrounding it are things of the past, and we now see it before us with its well-watered plains, clothed in summer with rich grass, its lakes and rivers abounding in fish, its grand mountain ranges and its pastoral nomadic population.

The Pamir is the name generally applied to that region extending from the Trans-Alai mountains on the north, to the Hindu-Kush on the south; on the east it is bounded by the plains of Kashgar and on the west by the cultivated valleys of the upper tributaries of the Oxus. Within these limits the Pamir is an elevated tract nowhere descending below 12,000 feet of absolute altitude, and crossed in all directions by ranges of mountains rising but a few thousand feet above the general level, except where massive groups of peaks crowned with eternal snow lift their summits high above the clouds.

Attempts have been made by scientific geographers to classify the Pamir ranges under one or other of the orographical systems of High Asia. Some have compared them with the Himalayas or with the Kuen Luen; others refer their topographical and structural or geological aspects to the Tian Shan; while others again are inclined to make of them a distinct, independent system connecting in a meridional direction the Tian Shan with the Himalayas. While there is much to be said for the scientific value of disquisitions of this kind, it has been very well pointed out by the late M. Sévertsof, that we have as yet too few positive facts relating either to their geology or topography to enable us to do that for the mountains of the Pamir which has been so successfully done for the Alps of Europe. Let us, then, content ourselves with what is known by actual survey rather than attempt to build up theories which later investigations may overthrow.

It has been usual to speak of the Pamir as a level expanse of steppe land stretching away, with but little interruption, for great distances—an erroneous idea derived from native and hearsay information, completely dispelled by modern explorations. Colonel Trotter, when he reached the Neza Tash Pass, where he expected to come in view of the Pamirs, was somewhat surprised at seeing before him nothing but a long range of low red-coloured hills about ten miles distant, a portion of which was pointed out to him as the Great Pamir, and another on the left as the Little Pamir. "Nothing was visible," he writes, "but an irregular mass of hills whose serrated tips did not appear to rise more than 1000 feet above the pass on which I was standing." The Russian Pamir expedition of 1877-8 found the surface for the most part occupied by rocky mountainous masses divided by valleys of moderate width, communicating with one another by lateral defiles or by easy passes across lower parts of the ranges, so that the roads or tracks followed by the traveller are generally level. Nevertheless, and notwithstanding its rugged surface, the Pamir with its lofty valleys may be correctly termed a table-land *with ranges and mountain masses piled upon it.*

The high peaks are very unequally distributed over the Pamir, occurring mostly on its marginal ranges. On the north, along the Trans-Alai range, rises the triple-headed Gurumda, all three of its summits rising above 20,000 feet, and the pyramidal Peak Kaufmann, 22,000 feet, further west; between it and the Kizil-art Pass are the massive Kizil-agyn, 20,500 feet, and other lofty mountains between 17,000 and 19,000 feet. Kara-kul is encircled with snowy peaks 17,500 to 18,000 in elevation, or about 5000 to 6000 feet above the lake; one peak between the Uzbel-su and Kara-art, an affluent of Kara-kul, is 19,000 feet high; another in the Muz-tau Mountains, at the sources of the Chon-su, 18,200 feet. The mountains round Rang-kul, more centrally situated, are the lowest of the Pamir, not exceeding 15,300 feet of absolute elevation. But beyond the lower ridges encompassing the Rang-kul valley on the east, two lofty groups of pointed summits have been observed. One of these, measured by Hayward, was found to be 21,000 feet, another, the grand Mustag-ata, the Tagharma of Gordon and Trotter, attains the height of 25,350 feet.

Within its marginal mountains the Pamir is a tangle of chains running in all directions; in this it differs from the Tian Shan, which has certain well-defined lines of upheaval, and Tibet, where the valleys are higher, wider, and the ranges have also a parallel direction. This absence of uniformity in the Pamir is the main characteristic of its orography; each so-called Pamir, with its environing mountains, its central lake, and the river or rivers draining into or flowing out of it, may be considered separately. Following the terminology of Yule adopted by geographers, and now well established, we have (1) Pamir Alichur; (2) Pamir Khurd (or "Little"); (3) Pamir Kalan (or "Great"); (4) Pamir Khargoshi ("of the hare"); (5) Pamir Sares: (6) Pamir Rang-kul.

A Russian geographer would naturally begin with the northernmost and finish with the southernmost; we will reverse this order, and suppose that we are approaching these Pamirs from the Indian side, and, having crossed the Hindu-Kush by the Darkote and Baroghil Passes, find ourselves on the Little Pamir. The watershed between two of the head-streams of the Oxus is situated near its western end. the eastern slope being by far the longer of the two. It is here the Ak-su (whence the word "Oxus" is said to be derived), the parent stream of the Amu-daria or Oxus, takes its rise in Oi-kul or Gaz-kul (Goose Lake), a small lake three miles long and a little under a mile wide, at an elevation of 13,100 feet above sea-level. After leaving the Little Pamir, the Ak-su flows northward under the name of Ak-tash (White Rock) from a high, pale-coloured rock on the right bank near the entrance of the valley, across the eastern openings of the Great and Alichur Pamirs, and sweeps into the Sariz Pamir at its confluence with the Ak-baital (southern), finally joining the Panja or Upper Oxus a little above Kala Vamar, the chief town and fortress of Shughnan.

(1) The Little Pamir is a long, level, grassy valley, from 2 to 4 miles in width, enclosed on either side by ranges of hills sloping gently towards it. Its length, from the southern extremity of the Ak-tash valley to a point 6 miles west of the lake, is about 58 miles. Westward of the

Little Pamir the valley soon loses its open steppe-like character, the Sarhadd, the southernmost of the head-streams of the Panja, having a deep set course between high banks rising up to the long mountain slopes of Langar and the Dasht-i-Baroghil (plain of Baroghil). The village of Sarhadd is in Wakhan territory, and four days' march below it the rivers of Little Pamir and Great Pamir unite near Kala-i-Panja, the capital of Wakhan. The Little Pamir is the most level of all the valleys; according to Trotter's barometrical observations, its fall is only 500 to 600 feet, whilst the Great and Alichur Pamirs have a fall of 2000 feet in approximately the same length.

(2) Pamir Kalan (Great) lies next to Pamir Khurd; its grassy valley or plain, about a mile wide, is also environed by mountains rising in terraces to a height of 5000 feet above Wood's Victoria (Sir-i-Kul) Lake, the Kul-i-Pamir-Kalan of the natives, 13,950 feet above the sea. The watershed of the Great Pamir lies about the centre; on the west the lake discharges its water into the (northern) Panja; on the east the river Isligh flows towards the Ak-su. The lake, which is ten miles long, was formerly supposed to have two outlets, till Trotter surveyed it, and found that all the drainage of the mountains at its head went into the lake, and therefore this has only one outlet. From the watershed the descent by the valley of the Isligh is at first steep, afterwards more gradual, to the Ak-su. Good roads lie along both Pamirs, Great and Little, from Kila Panja on the Oxus to Tashkurghan and Kashgar, the distance by either route being approximately the same. These in olden times were the great trade-routes leading from west to east and from east to west; by them Marco Polo, and many another traveller, journeyed to Cathay; by one of them, the Buddhist pilgrim Hwen Thsang returned from India.

(3) Pamir Alichur is the valley of a river of that name gradually widening towards the WSW., and then suddenly narrowing into a defile at the west end of Yashil-kul; a lake, two miles wide in its eastern half, where it is divided into two gulfs by a promontory and narrowing to two-thirds of a mile on the west. Through this lake flows the Alichur from east to west, not from the west, as was formerly supposed. Before joining the Ak-su the Alichur turns to the north-west, its entrance into that river being 60 miles to the west of the point assigned to it before the survey of Skassi. The whole valley from Chatyr-tash to Yashil (or Ishal) Kul is 37 miles, measured along its windiugs, the width varying from 1 to 10 miles. The shores of the lake are high and precipitous, particularly on the south, where the steep declivities of Bulun-tau fall immediately to the lake. Throughout this Pamir old moraines are very conspicuous, in some parts nearly filling the valley. It may be remarked that traces of glacial action are of frequent occurrence all over the Pamir, and especially in central parts such as the valley of the southern Ak-baital and the Alichur Pamir. From Yashil-kul to its confluence with the Ak-su, the Alichur flows for 30 miles through a series of gorges and valley openings in which eight Shughnan villages are situated. Within the elbow formed by this river a lofty snow-clad range is visible, having a general NE. and SW. direction. This was named by Sévertsof—

"Skassi range," in honour of one to whom the survey of the Pamir is much indebted. Besides the Yashil-kul this Pamir contains several other lakes—Sari-kul, Sassik-kul, Tuz-kul, and Bulun-kul, all situated in the same basin, and fed by springs and the perpetual snows of the environing mountains. There are other snowy ranges beyond the Skassi Mountains as high if not higher, probably bordering the right bank of the Suchan or Gunt River, which flows from the south-east and falls into the Panja. In the angle formed by the confluence of these rivers, and between the mouth of the Suchan and the Ak-su (Murgh-ab) on the north, there are great snowy mountains, 22,000 to 23,000 feet, seen from the east end of Yashil-kul, about 70 miles off.

Abdul Subhan, sent by Trotter to explore the Panja from Kila Panja to Kila Vamar in Roshan, does not mention these mountains, and their discovery is due to the Russians, by whom they were called "Chernayef Range," after the conqueror of Tashkent. Under this name they first appear on Gen. Stubendorf's map of 1880. Pamir Alichur communicates with Pamir Kalan by the Dasht-i-Khargoshi (Plain of the Hare), a wide meridional valley starting from a point opposite Ishal-tau. It was here that the surveys of the Russians crossed those of the British officers, in whose honour Sévertsof named several of the peaks and ranges: "Trotter," "Gordon," "Biddulph," and "Stoliczka."

(4) Pamir Rang-kul (Lake of the Wild Goat), joins on the east the large valley of Ak-baital belonging to Pamir Serez or Sariz. It consists of the two lakes Rang-kul, united by a stream, and the valleys descending upon it from the mountains, north, south, and east. It lies ENE. and WSW., has a length of 25 miles, and forms a northerly continuation of the lower valley of the Ak-baital. At its northern end the valley slopes very gradually towards the Ak-baital and Rang-kul basins, on either side the two lakes are 4 and 5 miles long, respectively, the lower one being the larger. Their shores are thickly encrusted with alkaline salts, yet the water is perfectly fresh except near the western end of the lower lake, where it has a brackish taste. The springs are so insignificant as not to supply a tenth part of the loss by evaporation, and no river discharges into these lakes. Under such conditions as these, one would have supposed the lakes would have been converted into saline swamps, and it is surprising that they should remain nearly fresh. This fact may be accounted for by subterranean drainage and flow of water under the surface, the surrounding strata being largely composed of porous limestones and sandstones overlying impervious shales.

(5) Pamir Serez is formed by the valleys of the Ak-su and some of its tributaries, the principal of which are the Ak-balyk, southern Ak-baital, and Kara-su. It takes its name from the Roshan village of Serez, near the Ak-su, a place not actually within the limits of our sketch, for the Pamir, strictly speaking, terminates at that part of the course of the Ak-su where this river bursts through the gorge of Jalpak tash-tau, at a height of about 11,000 feet. The village of Serez is 20 miles below this gorge, in an open valley, where a left-hand tributary joins the Ak-su in the meridian of the Tonchita pass.

(6) Pamir Khargosh (of the Hare) comprises the Great Kara-kul and

two chief subsidiary valleys east and west. The lake itself occupies hollows in both, where they meet and form two nearly detatched water-spreads, the smaller on the east, the larger on the west, communicating as already stated by a strait.

The problem of the discharge from Kara-kul was one of the most intricate the Russian surveyors had to solve. According to the earlier reports of Hayward and Shaw it discharged into the Surkbab, or river of Karateghin, others stated that its outflow joined the Panja at Bartang; Gordon and Trotter heard that it fell into the Ak-su, while others like Faiz Baksh omitted to mention it at all. M. Fechenko was the first to deny that the drainage of the Kara-kul went into the Karateghin River; while M. Kostenko, admitting that in earlier times a double discharge had probably taken place from the north end towards the Tarim basin, and from the south end to the Ak-su, declared that it was now an enclosed basin having no outlet. But Sévertsof's observations showed that even now, with a strong northerly wind, during flood-time the water of the lake was driven southward up the Chon-su, formed a sand dune across the bed of this river and escaped over it to flow westward by the Kuyandi and Lake Shukur to join the Ak-su.

Such then, briefly, are a few of the main features of the hydrography and orography of the inner Pamir plateau. Along its eastern border wide valleys or plains stretch northward from the Himalayas on the south to the Trans-Alai range on the north. These are known as Pamir Taghdumbash, the Taskurghan valley or district of Sarikol, the Tagharma and Kizil-art plains. They are bordered on the east by the range to which Hayward gave the name of 'Kizil-art,' the 'Kashgar Mountains' of Russian geographers. Trotter speaks of them as 'a magnificent row of snowy peaks,' constituting, as he had reason to believe, a meridional chain. Several of these peaks have been fixed by numerous bearings, the highest of all being Tagharma (25,350 feet), while two others are at least 22,500 feet. Towards the south they diminish very much in height, and would seem to be a connecting link with the Himalayas, or, perhaps, with the Kuen Luen.

Some doubts have been thrown on the existence of this great range. Kostenko saw it from the Uzbel-su Pass, fifty miles off, and describes it as a grand range rising far above the limits of perpetual snow, with peaks probably 25,000 to 26,000 feet high. In his opinion it completely vindicates Humboldt's theory of a great meridional so-called 'Bolor' range, the subject of warm controversy some years ago. Sévertsof saw the same peaks from a small valley joining the Pamir Rang-Kul due east of Uzbel; to him also they appeared as a continuous range. But from another point of view—the shore of Rang-Kul itself—these mountains no longer had the same aspect, but rose as a distinct group belonging to no particular range. He learned that their native Kirghiz name was *Mustag-ata* ('father of icy mountains'), and he came to the conclusion, upon the basis of his own and Trotter's observations, that, instead of forming a ridge 100 miles long, with a crest not much below the highest summits, they were a knot of mountains like Nanda Parvati, towering above a network of much lower ranges. All these questions can only be

decided when complete surveys have been made, and a good map drawn of the Pamir.

This marvellous region, known from time immemorial as *Bam-i-dunia*, or 'Roof of the World,' supports a scanty population of nomadising, marauding Kirghiz. In the west, along the upper valleys of the Upper Amu-daria or Panja, are settlements of Wakhanis, Shughnanis, and Roshanis, a people of Iranian race who are also met with in the Tashkurghan valley or Sarikol district on the east. The lot of these unfortunate Tajiks, as they are otherwise known, is a peculiarly unhappy one. The victims of cruel and oppressive government, they often abandon their homes in the lower valleys and seek refuge on the inhospitable wastes of the Pamir. Here they are either reduced to slavery by the Kirghiz or driven back by the Chinese, and, in their despair, seek shelter within Russian territory. Grombchefsky mentions having met with a large number of refugees from Kila Vamar, recently taken possession of by the Afghans, and describes their pitiable condition, the carcases of their dead animals tainting the pure air of these highlands. Scenes very similar must have taken place, according to reports which reached me while travelling in Central Asia in 1880, when the Chinese regained possession of Kashgar, and revenged themselves on the defenceless inhabitants.

In estimating the political future of the Pamir region we should bear in mind the advance of the Russian frontier towards India during the last quarter of a century, one of the most remarkable events of our time. This advance has been almost too rapid to allow of the consolidation of the conquered provinces, and the Muhammadan population may yet prove a source of weakness rather than strength to the conqueror. Nevertheless, with all the resources of modern science at her command, with a system of telegraphs and railways extending in all directions, Russia is now mistress of Central Asia. Her recent attempts to push forward expeditions to the valley of the Indus are signs of a restless and aggressive spirit, which may possibly be connected with discontent at home. Captain Grombchefsky is reported to have told a correspondent of the daily press who interviewed him in St. Petersburg, that Russia would not stay her advance southward till she gained an outlet on the sea-coast. But how the seaboard was to be reached without invading British territory does not appear to have been discussed. Strategically the Pamir may be of little value, but when once this formidable barrier has been turned either on the west by way of Badakhshan and Wakhan, or on the east by Sarikol and the Little Pamir, the road to India lies open. Chitral, Gilghit, Hunza, and other petty States in the mountains might be more disposed to join an invading force than resist it; and, according to the news just received, the people of Gilghit are actively hostile to the British. In our opinion measures should be taken to fortify our frontier, a corps of observation should be placed to watch the region south of the Oxus, and the survey of these regions, begun by Trotter in 1872, should be continued. It would also be advisable to control the predatory tribes on both slopes of the Hindu Kush in order to restore security to the trade-routes passing along the Great and Little Pamirs from Kila Panja to

Tashkurghan, Kashgar, and Yarkand. The Chinese are generally supposed to be friendly, but they are little better than barbarians, and are wholly unfit to cope with the disciplined troops of Russia. No dependence can be placed on them, judging from the circumstance lately reported of their surrendering an English officer (Lieut. Davison) to a Russian force. The dislike in which they are held by the natives, both on religious grounds as well as for their extreme cruelty, is another and a very strong argument against reposing any confidence in their intervention.

The Pamir is the reputed cradle-land of the Aryan race; and it is strange that some of the names mentioned in the tenth chapter of Genesis still linger here, scarcely changed through thousands of years. Thus we have Tagharma, evidently the same as Togarmah, the grandson of Japheth, meaning "rugged," then we have Yavan-tau, probably the same as Javan, the son of Japheth.

Let us hope that the descendants of those early inhabitants of the Pamir meeting in these days may not forget, in the heat of political strife, that there is a link between them, that the Slav and the Anglo-Saxon are brothers, and that the Pamir is wide enough for both.

We append a list of modern travellers, as complete as we can make it, who have visited the Pamir or neighbouring regions:—

1837-38. Lieutenant Wood, of the Indian navy, was the first European after Marco Polo to visit Badakhshan on his way from Kunduz to Pamir Kalan. He ascended the Koksha and its tributary the Zebak, and traced the Oxus to one of its sources in the Great Pamir lake.

1868-69. Mr. Robert Shaw crossed the Karakorum Mountains to Kashgar, whence he obtained a view of the Kizil-art range.

„ The same year Mr. G. W. Hayward also visited Kashgar, and explored the sources of the Yarkand River.

„ "The Mirza" crossed the Pamir from Faizabad in Badahkshan to Kashgar.

1870. Mr. Hayward explored Gilghit and Yassin, where he was murdered.

„ The Havildar travelled through Chitral to Faizabad.

1873. Sir Douglas Forsyth's mission to Kashgar. Expeditions across the Pamir by Lieutenant-Colonel Gordon, Captain Trotter, Captain Biddulph, and Dr. Stoliczka. Examination of the Chitral passes by Captain Biddulph and Resaldar Muhammad Afzul Khan.

1874. Abdul Subhan runs a line of survey down the Panja to the borders of Roshan and Darwaz. He was the first explorer to make known the western borderlands of the Pamir.

1875. Hissar expedition, under Maief, explored nearly the whole of the Hissar plateau, and crossed from Faizabad to Kulab, returning by the valley of the Kafirnihan to Kobadian.

1876. The Havildar takes a survey up the Amu-daria from the mouths of the Kafirnihan, Ak-serai, and Vakhsh to Yazgulam in Darwaz.

„ Skobeleff's expedition to the Alai. Kostenko, Bonsdorf and Lébedef take part in it. They explore the Great Kara-kul lake, and extend their survey to the Uzbel Pass, ninety miles beyond the Alai.

1877-78. Ferghano-Pamir expedition under Sévertsof. Skassi surveys the Alichur, Rang-kul, and Sarez Pamirs.

1878. Karateghin expedition. Messrs. Oshanin and Rodionof carry a line of survey along the northern boundary of the western Pamir borderlands from Regar to the mouth of the Muksu, naming and discovering Peter the Great and Yavan-tau ranges.

„ Colonel Matvéief reconnoiters north-western parts of Badakhshan along both sides of the lower Koksha; supplements and completes the Hissar surveying expedition's work.

1879. Maief reconnoiters the Kafirnihan River from Hissar to its mouth.

1880. Regel makes a botanical expedition in Darwaz, and fills in cartographical details.

1878-81. A native topographer, M. S., attached to the Great Trigonometrical Survey of India, reconnoiters the south Sarhadd range, the plateau of Ishkashm and the sources of the Mastoj. His observations, plotted on General Walker's map of Turkestan, are said to be inaccurate by Russian geographers, especially for those parts of the Pamir affected by them.

1886. Ivanof's Pamir expedition.

1888. MM. Bonvalot, Capus, and Pépin cross in winter (March-April) the Pamir from Osh, in Ferghanah, by the Taldik Pass, Kara-kul, Rang-kul, the Ak-su valley, Ak-tash and the Little Pamir, descending into India by Sarhadd and Chitral.

1890. Mr. and Mrs. St. George Littledale cross the Pamir from Russian Turkestan.

„ Captain Grombchefsky crosses in August and September the Pamir by the Murgh-ab (Ak-su) and Lake Yashil-kul. Explores the valleys of the Hindu-Kush and Himalayas, including the Raskem-daria, and is refused permission to winter in Kashmir.

1891. Messrs. Cumberland, Bower, and others, are reported to be travelling in the Pamir. Captain Younghusband and Lieutenant Davison arrested by orders of the Governor-General of Turkestan.

*** During the summer many Russian military detachments march over the Pamir as covering-parties to topographers, who have filled in cartographical details of that region. At the same time M. Borschefsky investigates the minerals.

THE ORTHOGRAPHY OF FOREIGN PLACE-NAMES.

By Jas. Burgess, LL.D., C.I.E., Etc.

The *Report* of the United States Hydrographic Office Board on the Orthography of Foreign Geographic Names, recently issued, is a document deserving the attention of all geographers. In the introduction, the Hydrographer remarks that "the lack of a uniform and comprehensive system of spelling geographic names has long been felt, and many attempts have been made to overcome the difficulties operating to prevent the adoption of some one method that might in a measure settle the vexed question. To an office engaged in the publication of charts and sailing directions covering the waters of the globe, the want of systematic method becomes especially formidable, inasmuch as the publications emanating from it are regarded as having the sanction of official authority; and, without some uniform standard system to proceed upon, doubt and confusion must necessarily be the result of inconsistencies

and discrepancies, sometimes so great as to cause the same place to become unrecognisable under its various disguises in the way of spelling. Foreign Governments have long recognised this difficulty, and the Hydrographic Offices of Great Britain, France, and Germany have carefully considered the subject, each taking the initiative in their respective countries."

In 1890 a Board of Foreign Geographic Names was officially created by the United States Government, to deal with the question, and its decisions were ordered to be accepted by the Departments of War, Navy, and Post Office, and by the Coast and Geodetic, and the Geological, Surveys. This Board communicated with the Hydrographic Offices of other countries; and it appeared that in France a commission appointed by the Société de Géographie, on which the French Hydrographer, M. B. de la Grye, acted as secretary, had reported in 1886 in favour of a system largely formulated upon the British, and on proposals made by the French Hydrographic service. The German Hydrographic Office also adopted rules in 1888, closely following the earlier British system.

In examining these systems, the Board considers that they divide all geographical names into two classes, on the following propositions:—

"1. Geographic names originating in languages that are written in Roman character should be spelled as in the country having jurisdiction. The French and German systems allow exceptions to this rule in the case of names which, through long custom, have become generally known in another form:" as (French) La Mecque, Naples, Calcutta: (German) Kopenhagen, Neapel, Genua, Zanzibar, Zulu.

"2. Geographic names originating in languages without literature, and in languages that require transliteration into Roman characters, should have their spelling based on the true sound of the word as locally pronounced."

It is not apparent why here and in its "rules" given below, the Board has so entirely separated, in this second class, all languages with alphabets, however perfect for the representation of their sounds, from those using the purely Latin alphabet, and has, moreover, grouped them along with those devoid of any form of writing. Surely it would prevent some confusion of thought to make at least *three* classes, of which the second should consist of those geographic names originating in languages using alphabets like the Arabic, Russian, and the various derivatives of Sanskrit, which are susceptible of scientific transliteration. Languages like Chinese—which is not alphabetical, and those without any form of writing, might either be classed together or separately. It is a recognised fact that the alphabets referred to are essentially phonetic, and represent the sounds in their own languages with far more precision than the Roman alphabet does those of the tongues of Western Europe and America. Further, under conditions as little inconvenient as those implied for the first class, a well-advised system of transliteration would present in Roman letters the sounds of names in these foreign languages much more consistently than any phonetic system—which must ever be dependent on the ear and intelligence of the individual alone.

In regard to the values of the letters to be used in transliterating names under this second class, the three European systems are in such close agreement as to be practically almost identical. This has resulted from the practical adoption by France and Germany of the British system, which accepts the Continental sounds of the vowels. The following comparative table illustrates this, and gives also the American Board scheme of vocalisation—where names are to be represented phonetically—and of transliteration, where that is to be accepted :—

United States.	British.	French.	German.	Spanish.
a as in *father*	a	a	a, å	a
e as in *benefit*	e	e	e	e
i as in *ravine*	i	i	i	i
o as in *mote*	o	o	o	o
u as in *flute*	u	u	u	u
			ä or æ	
ö nearly as German ö or French *œ*		œ	ö or œ	œ
ü like German and French *ü*		ü	ü or ue	ü
ai as *i* in *ice*	ai		ai	
au as *ow* in *how*	au		au	
ao as in *Nanao*	ao		ao	
ei nearly as in *they*	ei		ei, as *i* in *mine*	
b English *b*	b	b	b	b
c always soft as in *center*	c	c	c	c, also z
ch as in *church*	ch	tch or ch	ch	ch
d English *d*	d	d	d	d
f English *f*	f	f	f	f
g always hard	g	g	g	g, hard before *a*, *o*, *u*, *ue*, and *ui*
h always pronounced when inserted	h	h	h	h
j English *j*	j	dj or j	j	y, consonantal
k English *k*, also replaces hard *c*	k	k	k	k, also qu
kh Oriental guttural, as in *Khán*	kh	kh	kh	j
gh Oriental guttural, as in *Ghúzi*	gh	gh	gh	j
l English *l*	l	l	l	l
m English *m*	m	m	m	m
n English *n*	n	n	n	n
ng as in *finger* and *singer*	ng	ñ		ñ
p English *p*	p	p	p	p
ph as in *loop-hole*, not to be used for *f*	ph			
q not employed		q[1]		
kw replaces *qu* (as in *quiver*)	kw	qu	k, also ku	qu
r English *r*	r	r	r	r
s English *s*	s	s	s	s
sh as in *shelf*	sh	sh	sh	sh
t English *t*	t	t	t	t
v English *v*	v	v	v	v
w English *w*	w	w	w	w
x English *x*	x	x	x	x
y always consonantal, as in *yard*	y	y	y, also j	y
z English *z*	z	z	z	z

[1] For the Arabic *qáf* in Qoran, Talaqan, Bilqa, Reqem, Qelb, etc. This is the same as the Hebrew ק.

A study of this table, says the *Report*, suggests "the possibility of future international agreement as to the phonetic value to be attributed to each letter in spelling geographic names requiring treatment from a phonetic basis. Practically but few difficulties now exist, and these might be eradicated by an international congress." But in the way of the practical application of these systems, the difficulties, as the report adds, "are various and many, and not the least is the uncertainty existing in regard to the correct local pronunciation of many of the names in distant foreign lands that use another than the Roman character in their writing, and many years will pass before these difficulties will have disappeared. Where the local pronunciation of the name is absolutely known, it may be readily spelled under the general system; but where the written form only is available, detailed systems in harmony with the general system can be advantageously used for transliterating, and thus assist in bringing about the ultimate object."

With reference to this last statement, the *Report* also furnishes detailed systems for the transliteration of Greek, Russian, Japanese, and Korean names, and supplies some data towards formulating guidance for Malay and Chinese. One is rather surprised, in presence of all this, that no reference is made to Turkish, Persian, and the other languages using the Arabic alphabet.

The Board submits the following rules for the orthography of place-names:—

"(*a*) The more prominent geographic names, the orthography of which is already fixed by universal adherence to a certain form, or which are spelled *in but one way* in American and English literature, shall not be changed, although their spelling may not be in accordance with rules (*b*) and (*c*). Examples: Athens, Bombay, Ceylon, Germany, Spain, St. Petersburg.

"(*b*) Geographic names in countries which use the Roman or Gothic characters in writing their language shall be rendered in the form found in the latest official publications, maps, and books of the country having jurisdiction. In cases, however, where the form of a place-name hitherto used is so different from the official form that the identity of the latter with the former might not be recognised, the old form shall be added in brackets; as, for instance, Livorno (Leghorn), s'Gravenhage (The Hague), Wien (Vienna).

"Where there is a conflict of jurisdiction, as it were, over a geographic name, as, for instance, in the name of a body of water separating two or more countries, or as in Polynesian or African names, rule (*a*) or (*c*) shall be applied. Thus, Swedish and Norwegian 'Skagerak,' Danish 'Skagerrak,' is an example where choice lies only in the spelling, and under rule (*a*) preference is given to double *r*, 'Skagerrak'; but in the Baltic (Baltiskoe More, Baltisches Meer, Ostsee, Östersjön, etc.) the choice lies first in the proper name, and Baltic is retained under rule (*a*); while the Dutch, Spanish, or other rendering of Polynesian names must be treated under rule (*c*) if not in accord with the general system.

"(*c*) Geographic names from languages that require transliteration into Roman character, and geographic names originating in languages

without literature shall have their spelling based on the true sound of the word as locally pronounced, and in accordance with the general system of sound equivalents given below :—

Letters.	Pronunciation and Remarks.	Examples.
a	*ah*, *a* as in *father*.	Java, Banána, Somáli, Bari.
e	*eh*, *e* as in *benefit*.	Tel-el-Kebír, Oléleh, Yezo, Medina, Levúka, Peru.
i	English *i*, as in *ravine* ; the sound of *ee* in *beet*. Thus not *Feejee*, but	Fiji, Hindi.
o	*o* as in *mote*.	Tokyo.
u	Long *u* as in *flute* ; the sound of *oo* in *boot*. Thus not *Zooloo*, but	Zulu, Sumatra.
ö	German *ö* (*œ*).	Söchhön.
ü	The French sound of *u* (*ü*) ; or the German *ü* (*ue*).	Börküt.
	All vowels are shortened in sound by doubling the following consonant.	Yarra, Tanna, Mecca, Jidda, Bonny.
	Doubling of a vowel is only necessary where there is a distinct repetition of the single sound.	Nuulúa, Oosima.
ai	English *i* as in *ice*.	Shanghai.
au	*ow* as in *how*. Thus, not *Foochow*, but	Fuchau.
ao	is slightly different from above.	Macao.
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from *ey* in the English *they*.	Beirút, Beilúl.
b	English *b*.	
c	is always soft, but is so nearly the sound of *s* that it should be seldom used.	Celebes.
	If *Celebes* were not already recognised, it would be written *Selebes*.	
ch	is always soft, as in *church*.	Chingchin.
d	English *d*.	
f	English *f* ; *ph* should not be used for the sound of *f*. Thus, not *Haiphong*, but	Haifong, Nafa.
g	is always hard (soft *g* is given by *j*).	Galápagos.
h	is always pronounced when inserted.	
j	English *j*. *Dj* should never be put for this sound.	Japan, Jinchuen.
k	English *k*. It should always be put for the hard *c*. Thus, not *Corea*, but	Korea.
kh	the Oriental guttural.	Khan.
gh	is another guttural, as in the Turkish	Dagh, Gházi.
l, m, n	as in English.	
ng	has two separate sounds, the one hard as in the English word *finger*, the other as in *singer*. As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.	
p	as in English.	
ph	as in *loophole*.	Chemulpho, Mokpho.
q	should never be employed ; *qu* is given as *kw*.	Kwangtung.
r, s, t	as in English.	

Letters.	Pronunciation and Remarks.	Examples.
v w x	as in English.	Sawákin.
y	is always a consonant, as in *yard*, and therefore should never be used as a terminal, *i* or *e* being substituted.	Kikúyu.
	Thus, not *Mikindány*, but	Mikindáni.
	not *Kwaly*, but	Kwale.
z	English *z*.	Zulu.
	Accents should not generally be used ; but where there is a very decided emphatic syllable or stress, which affects the sound of the word, it should be marked by an *acute* accent.	Tongatábu, Galápagos, Paláwan, Saráwak."

This alphabet, it will be seen by comparison with the previous table, is almost the same as that adopted by the British Hydrographic Office, with the addition of the vowels *ö* and *ü*, with diacritical marks, and is almost as satisfactory as could well be expected. Both provide *kh* and *gh* for two of the Arabic gutturals, but reject *q* for the third. The French, however, have wisely retained the *q* as a good representative of the Turkish, Arabic, and Persian guttural *qáf* (ق), familiar to us in the word *Qoran*. It has a distinctly different sound from the letter *káf* (ك), which corresponds to our *k*; and since *q* is not required for any other sound, it is well to adopt it for this letter, as it is already largely in use among scholars in transliterating quotations from the Arabic alphabet. It is required to preserve the sound in names like Quraish, Qairwân, Qulzum (Clysma), Qatif, Qazwin, Qapchaq, Aqlid, Qablah, Dauraq, Qansarin, Qûs, Qarqisia, Qarqub. etc.[1] The British system has also recently added the digraphs *aw* (as in *law*), *hw*, and *zh*.[2]

This British Admiralty system, adopted in 1885 by the Royal Geographical Society and by the War Office, has also been accepted by the Colonial Office, which has disseminated circulars to the Governments of the various colonies. There is thus no backwardness on the part of our Government in recommending a system by which some principle in writing geographical names might be introduced in our maps and books. The difficulty is to get the general public, or even scientific societies and official authorities, to adopt and consistently adhere to this or any international system. The American system does not essentially vary from that of our own Admiralty, except in some of the detailed applications to different alphabets, and in inclining to spell many names rather by the ear than according to their vernacular written forms. Both lay too much stress on sound, to the neglect of vernacular spellings.

[1] We may not perhaps be quite prepared yet to introduce it into such familiar names as Asqalon, Qaisariah, Samarqand, Qilmaq (Calmuck), Demeshq (Damascus), or Ladiqiah ; but this may possibly yet come about; less familiar names might well be used in their correct form at once.

[2] As in Hwang-ho and Ngan-hwi ; and in Muzhdaha.

In France a ministerial decision, dated 21st June 1887, decided to use the rules proposed by the Société de Géographie of Paris in April 1886 for the spelling of native place-names.[1] These rules are remarkably international, and discard distinctively French representations of sound like *ou, u, eu, ch, dj*. In countries using the Roman character it is ruled, in accordance with the British system, that geographic names shall be written in the orthography of the country to which they belong. In others the following alphabet is adopted for transliterative purposes, as well as for the phonetic spelling of names in countries having no proper alphabet:—

a, e, i, o	to be sounded as in Italian, French, Spanish, and German.
e	shall never be mute.
ü	with a *tréma* like German *ü*, to represent the French sound of *u*.
u	as in Italian, etc., to represent the French sound of *ou*.
œ	as in *œil*, for the French sound of *eu*.
consonants	mostly as in French, etc., but—
g and s	always hard as in *gamelle, sirop*.
sh	to represent the French sound of *ch, Shérif*.
kh and gh	to represent the strong and soft Arabic gutturals.
th	as in English *path* (Greek *θ*).
dh	as *th* in English *those* (Greek *δ*).
y	to represent the semi-vowel, as in *yole*.
w	as in English *William*.
h	always aspirated, or modifying the preceding letter.
ñ	*n* with a *tilde*, to sound as *gn* in *seigneur*.
q	used to represent the Arabic *qâf* (as in *Qorân*).
··	Arabic *aïn* may be represented by a double dot.
^	The *circonflexe* indicates the lengthening of a vowel.

The German system, adopted in 1888, also follows closely the British system.[2] It adds, however, the German symbols *ä, ö, ü*, with their German sounds, and the Skandinavian *å*; uses *j̈* for the English sound of *j*; *ch* and *ſh* respectively for *tsch* and *sch*; and permits the doubling of a consonant to render the preceding vowel clear. This last is an expedient that is liable to misuse, however, and should be employed with care and not at random.

In Spain, though a system has been under consideration, it does not appear to have quite come into operation. Its principal features are given above in the general table.

It is thus clear that there is not only a fair consensus of opinion in favour of a uniform and international system of spelling geographical names, but a practical agreement to discard national peculiarities in favour of one phonetic Roman alphabet.

The differences on this point are almost confined to the addition or rejection of diacritical marks and accents on a few letters. These marks are certainly very helpful to the correct pronunciation of foreign names, and German cartographers, at least, seem to have no difficulty on the

[1] *Bulletin Soc. Géog.* 1886, pp. 193-202.

[2] Published in the *Annalen der Hydrographie*, 1888, p. 543; and *Nachrichten für Seefahrer*, 1888, p. 624.

score of using them on their maps, and appear to adhere most creditably to consistent transliteration of names from languages with other alphabets.

The objection to the use of diacritical marks seems to be often pushed to an extreme. What is their use? Let any one open a good pronouncing English dictionary to see their necessity even for English words. They indicate varieties of sounds expressed in type by the same symbol. We learn the particular sound, and then dispense with the diacritical marks in our books, except in a few cases. When once names have become familiar, there is much less need for such phonetic helps, and they might be given only in the gazetteer, the "index geographicus," and school geography. Crécy, Châlons, Nîmes, Béarn, Barèges, Mézières, and hundreds more, we should pronounce the same with or without the accent; yet, for sufficient reasons, it is well to mark it. In other languages they play a larger part than in English. And the American Board has found it desirable to introduce two marked vowels that had not been employed by the British Hydrographic Office.

There are, moreover, in the Slovenik, Sanskritic, and Arabic alphabets, letters to express modifications of the sounds of *s*, *z*, *h*, *n*, *t*, and *d*, for which the Roman alphabet has no equivalents, and if we are to indicate these additional sounds, we can only do so by diacritical marks. This is inconvenient in printing; and so it would be to print English books indicating by marks the seventeen different sounds or thereby which we represent by the five vowel letters, and the ten others we represent by the four symbols, *c*, *g*, *ch*, and *th*. But as we do with ordinary words, we can do with place-names. In the pronouncing vocabulary or index we may represent them with diacritical marks on letters having modified sounds: on maps and in ordinary literature, we may spell as in the index, but without these marks—unless, as may be desirable in some cases, we introduce italic letters for those that are modified. Let only a rational system of *transliteration* be established, with diacritical marks for the index and the use of the learner, and the way of progress in this matter will be much cleared. But it need not be altogether overlooked that for maps, whether lithographed or engraved, diacritical marks can be inserted without the sort of inconvenience they present to the compositor.

Captain W. J. L. Wharton, the Admiralty Hydrographer, remarks on the practical outcome of the system, that "to revise the names at present existing is a herculean task, and one that must occupy many years; for our system being necessarily on a phonetic foundation, the proper sound of a name is required before it can be reduced to writing. This is, I find, the most difficult item to deal with, and I am obliged mainly to content myself with reducing to system such names as are manifestly spelt in contradiction to it. This is done whenever a book of sailing directions is revised, as it is desirable that charts and books should go together, and on these occasions many charts undergo a complete overhaul in this respect."

What Captain Wharton calls the phonetic system must, of course, rule in all languages without an alphabet; in others the native spelling ought surely to be as authoritative as in German or Italian. It is here, we

reiterate, that the real difficulty lies: if the geographer would call in the aid of the scholar and accept his decision as to transliteration, the greatest of all the difficulties would disappear; persist in aiming at spelling names by the ear only, and all progress will be stopped by multiplied difficulties.

It will, moreover, be found that, as already stated, in cases under the Board's second class, the written form, accurately transliterated, will yield a far better representation of the name than any attempt to write it down from the pronunciation alone: local pronunciation varies so greatly, and is so very difficult to fix with certainty, that personal differences of pronunciation and of hearing will always combine to produce innumerable divergences in the representation of names; whereas all other alphabets are more uniformly phonetic than the Roman (especially as used by English-speaking peoples), which renders transliteration the best guide to sound.[1]

Wisely, too, the Admiralty considers no geographical dictionary hitherto published as a standard, and examines different authorities which may be considered most worthy of credence for each separate district. "The question of those names which are already well known under a certain form is another great stumbling-block. It is impossible to sweep away forms known for years to all English-speaking people, and where to draw the line is the difficulty." Here the American Board rule (*b*) would best solve the difficulty, and familiarise the public with the correct forms before those so long known are swept away. New forms can only be introduced gradually, and by carrying the knowledge of the public along with such advances and corrections.

In the detailed system of the American Board for Greek names, it is proposed to transliterate *η*, *ι*, *υ*, *ει*, *οι*, and *υι*, all by the same letter *i*, *β* by *v*, *φ* by *f*, *χ* by *kh*, *αι* by *ei*, *οι* by *u*, *αυ* by *af* or *av*, *ηυ* by *iv* or *if*, and *ευ* by *ef* or *ev*. Hence Cephalonia will be changed to Kefallinia, Eubœa to Evvia, Leucata to Lefkata, Ducata to Dafkata, and Γέρακα to Yeraka. Here the Greek spelling, and, to a certain extent, the sound also, are sacrificed to a rigid adherence to an arbitrary rule. In a language using an alphabet which is the origin of, and practically the same as, the Roman, which—though not written quite phonetically—is connected with a country of such universal interest as Greece, it is surely desirable to allow analogous liberties as in German and other languages,

[1] The fourth of the rules adopted by the Royal Geographical Society lays it down that "an approximation to the sound of place-names is alone aimed at." This is hardly consistent with Rule 3, that "the *true sound* of the word as locally pronounced" is to be represented in the spelling. In languages possessing an alphabet, may we not often voluntarily sacrifice some truth to the delicacy of the ear of an individual trying to represent phonetically "the true sound"? Transliteration, on the other hand, is always a very close approximation to the true sound, and usually the closest possible; it does not depend on individual peculiarity of enunciation or of hearing; and it is consistent in the representation of all names in a tongue. Then, there are translated works (constantly increasing in number) from these written languages in which numerous place-names are transliterated, and we can only keep our maps in accordance with this important literature by spelling the names in the same way. Besides, it must be a gain to represent names in such a way that a foreigner, knowing the Roman alphabet, can transpose them at once back into the equivalent characters of his own.

and to adhere to the familiarised native spelling as far as practicable, only rendering the transliteration more consistent.

F. Baron de Haan remarks that the Serbian and several other languages are transliterated on Austrian maps by one simple unvarying system "in accordance with rules which leave no doubt as to the pronunciation of any name. These precepts are generally few, and very easily rendered in a synopsis" that "may be printed on a chart." Why may we not do the like with Greek? The rule that German, Italian, French and other names shall be spelt as in the countries having jurisdiction is of primary importance, and rightly overrules minor phonetic considerations: Wien and Jena are not to be changed into *Vin*, and *Yena*,—why then should Εὐβοία be written *Evvia*? We have to learn the pronunciation of German names and write them as Germans do, but in the Roman alphabet; and it is quite as easy and reasonable to do the same with Greek names: the principal rules for modern Greek pronunciation can be presented, if necessary, in a very short synopsis.

Moreover, very many place-names in Greece are familiar to us in transliterated forms: but if we are to introduce a new phonetic system representing Γ not merely by *g*, but sometimes by *y*, *yh*, *gh*, or *ng*, as it must be sounded before a small vowel, or in conjunction with certain consonants (and so with other letters),—the Greek forms will scarcely be recognisable under the transformation. We may heartily approve of Khalkis, Korinthos, and the like; but may seriously hesitate to accept Evvia, Itháki, Lefkas, Yeraka, and such as disfigure the original well-known spelling. No more than the map of France should that of Greece be turned into a pronouncing vocabulary. Here the American Board proposals are surely not well considered, and it is to be hoped they will not be accepted by geographers and map-makers. They may be cited as another instance of the danger of substituting an attempt at imaginary phonetic representation for honest transcription.

In Russian, the Board appears to be dissatisfied with previous authorities on English equivalents for the Russian alphabet, including a system published in *Nature*, as adopted by many scientific institutions. The main objections to these systems, apart from disagreement as to occasional sounds, being comprised in the use of diacritical marks and in the equivalents proposed for *zhé*, the 7th letter, and for Θ. For the first of these they propose *j*, which is not used for any other letter; but it is not a good phonetic representation of the sound, which is nearest that of *s* in *pleasure*, or *z* in *azure*, and is better represented by *zh*. Θ (*phíta* —the 34th) is equivalent to *ph* in English, but the Board proposes *f*, which it also adopts for Φ. Surely *ph*, though a digraph, might have been retained for the former, so as to preserve the difference for philological purposes—which we cannot afford altogether to dispense with—rather, which scholars wisely seek to retain as far as practicable. Further, the semi-vowel *i-s'-kratkoĭ*, the last letter of the alphabet, is not transliterated after *i*. The system proposed is contained in the following table:—

RUSSIAN.		ENGLISH EQUIVALENTS.	RUSSIAN.		ENGLISH EQUIVALENTS.
А а	*А а*	*a*	Т т	*Т т*	*t*
Б б	*Б б*	*b*	У у	*У у*	*u*
В в	*В в*	*v*	Ф ф	*Ф ф*	*f*
Г г	*Г г*	*g*	Х х	*Х х*	*kh*
Д д	*Д д*	*d*	Ц ц	*Ц ц*	*ts*
Е е	*Е е*	*e*	Ч ч	*Ч ч*	*ch*
Ж ж	*Ж ж*	*j*	Ш ш	*Ш ш*	*sh*
З з	*З з*	*z*	Щ щ	*Щ щ*	*shch*
И и	*И и*	*i*	Ъ ъ	*Ъ ъ*	
І і	*І і*	*i*	Ы ы	*Ы ы*	*ui*
К к	*К к*	*k*	Ь ь	*Ь ь*	
Л л	*Л л*	*l*	Ѣ ѣ	*Ѣ ѣ*	*ye*
М м	*М м*	*m*	Э э	*Э э*	*e*
Н н	*Н н*	*n*	Ю ю	*Ю ю*	*yu*
О о	*О о*	*o*	Я я	*Я я*	*ya*
П п	*П п*	*p*	Ѳ ѳ	*Ѳ ѳ*	*f*
Р р	*Р р*	*r*	Ѵ ѵ	*Ѵ ѵ*	*ö*
С с	*С с*	*s*	Й й	*Й й*	*i*

Here it appears to have been entirely forgotten that the Slovenik family of languages generally employs the Cyrillic alphabet, with some necessary omissions or additions to suit the necessities of each tongue; and that, alongside this, we have a co-ordinate alphabet in Roman characters, which is used in Poland and elsewhere, and which in Serbian is employed by the Catholic Croats, while the Cyrillic is favoured by the Serbs of the Greek Church. The one alphabet is transliterative of the other, and is established in the literature of the countries concerned: and with

this any proposed mode of spelling place-names in Austria, Servia, Bulgaria, Russia, etc., must take account. In face of a recognised system no counter proposal of a society or congress can possibly prevail. If we accept the spellings on the maps of the Austrian Government, as agreed in the first rule, we *therein* adopt this system of transliteration for large areas of that empire. Shall we adopt a different system for the neighbouring lands of Servia, Wallachia, and Bulgaria, or even Russia; or shall we accept an established system of transcription, recognised and used in certain Slovenik countries, and apply it consistently to all?

The Roman alphabet is adapted to the Cyrillic, by adding diacritical marks on the *z*, *c*, and *s*, and by a few digraphs, to represent the sounds we would express in English by *zh*, *ch*, *jh*, etc. If we find it is, for typographical reasons, desirable to avoid consonants with diacritical marks, then the analogy of the *h* in each case, in place of the mark, would be preventive of confusion in thus rendering the 7th, 24th, and 25th letters of the Russian alphabet. The 22nd, X, is represented in this system by the Roman *h*, which is sounded as a guttural, as in German "acht"; the 23d is transliterated by the Roman *c* with a sound like *ts*. The 28th letter (*yirî*) has not the sound of *ui* except accidentally, but of *i* and *y* in "pity," and is represented by *y*; the 35th (*izhitza*) has hardly the sound of German *o*, but of Italian *i* somewhat long; while the last letter (*i-s'-kratkoĭ*) is nearly mute, as *y* in "toy," and is in fact ĭ. The 27th letter (*yer*) is like our mute *e*, but makes the preceding consonant *hard*, as if doubled; *yeri*, the 29th, makes the preceding consonant *soft*, and often at the end of words has the short sound of *i* in "bit"; it is represented in Bohemian by the apostrophe ('). Lastly, Φ is distinguished from Θ (*phîta* or *thîta*) by rendering the latter by *ph*, which can occasion no difficulty. The 31st is the only letter not found in the Cyrillic alphabet.

The Serbs use six letters not in the Russian alphabet, and which they transliterate by—*gj* (or *dj*) with the sound of *dy* (Magyar *gy*); *j* (*y*); *lj* —like the Italian *gl* (Magy. *ly*); *nj* (*ñ*) like *gn* in French and Italian; *ć* with a sound between *ch* and *ts*; and *dž* a guttural *j*. But it drops all letters after the 25th in Russian; other Slovenik alphabets drop the last three, whilst Wallachian adds *x* (ξ) and *ps* (ψ).

The transliterated alphabet in general use (together with English equivalents to avoid diacritical marks and the continental sound of *j*) is —a, b, v, g, d, e, z (*zh*), z, i, ï, k, l, m, n, o, p, r, s, t, u, f, h, c, č (*ch*), š (*sh*), šč (*shch*), (*yer*), y, ', je (*ye*), ju (*yu*), ja (*ya*), ph, y (ĭ).

The American proposed alphabet for transliterating Russian, then, does not take sufficient account of recognised conditions; but to do so only a few changes have to be made in it (*i.e.* in the transliteration of the 7th, 22nd, 23rd, 28th, 34th, and 35th letters); and this would adapt it generally also to all the Slovenik countries not already using the Latin alphabet exclusively.

Japan may be said to have already an official geographical nomenclature in Roman characters, and this has been adopted by the Board with slight changes.

With regard to Chinese names, the prevailing diversity is well

illustrated by the varying spellings of the names of six Chinese provinces by different authors, thus:—

Keith Johnston	Quei-chow, Sze-chuen, Hoo-pe, Fo-kien, Ngan-whi, Chi-li.
Black . .	Kuei-choo, Szu-chuan, Hou-pe, Fu-kian, Ngan-hoee, Che-lee.
Stieler . .	Kwéi-tschou, Sz'-tschwan, Hu-pe, Fo-kien, Ngan-hwei, Tschi-li.
Stanford . .	Kwei chau, Sz chuen, Hu peh, Fu kien, Ngan hwui, Chi li.
Dr. W. Williams	Kweichau, Sz'chuen, Hupeh, Fuhkien, Nganhwui, Chihli.

The Board gives the preference to the system of Dr. Wells Williams, which it fairly deserves.

In regard to Indian names, the authority of Hunter's *Gazetteer* has been, perhaps rashly, adopted by our Admiralty. In a former paper (*S. G. M.* vol. vii. p. 357) reasons have been given why the spellings in this work should not be accepted *en bloc*. It is to be understood, however, that it is not the *system*—which was intended to be transliterative—that is at fault; a large number of names have been corrected in that work, and others have been brought nearer to their proper forms than was previously the case; the dissent applies only to those names that are still presented, against all system, under wrong forms of spelling. Were the work thoroughly revised by competent scholars, it might then be regarded as authoritative, and it will be a pity if the next edition is not very carefully revised in this respect.

Burmese place-names have hitherto been badly represented on all our maps. The Burmese, Siamese, and Kambojan alphabets are purely Sanskritic, and even the forms of the letters may be distinctly traced in the older types of the Indian alphabets from which they have branched off. The letters also retain the Indian sounds of the vowels and consonants, arranged in precisely the same order. In Burmese, however, the letters for *s* and *sh* are omitted, the vowel *ai* is sounded as a lengthened *ē* (Italian), and the palatals are pronounced more like *ts*, *ch*, *z*, and *zh*, than the sounds of *ch*, *chh*, *j*, and *jh*, given to them in India, while the sibilant *ś* has often in Burmese the sound of *th* in "thin," but also that of *fh* in "fhin"; it is in fact a lisped cerebral *s'*. The Jonesian alphabet, as modified by Wilson, would answer equally for the transliteration of all Burmese,[1] Siamese, Kambojan, Singalese and Tibetan names, as for those of purely Indian ones.

For Turkish, Arabic, and Persian names, as already mentioned, the American Board has supplied no detailed system. Here it would be well to adopt a mode of transcription already accepted by scholars, with only such modifications as are necessary in ordinary printing—reserving the details of diacritical marks for scientific indexes and guides to the

[1] The transcription of the Burmese palatal and guttural nasals by *gny* and *gn* is undesirable; they have simply the sounds naturally given to the nasal *n*, when it accompanies a palatal and guttural respectively, and do not require digraphs and trigraphs to indicate this. In the standard alphabet they are indicated by *ñ* and *n̂*. The combinations *ht* and *hp*, sometimes used to represent the aspirated forms of *t* (palatal and lingual) and *p*, are also deceptive and may well be dispensed with, for the corresponding Indian transliteratives of *th*, *t̲h*, and *ph*.

pronunciation of geographical names. The difficulty connected with this alphabet, used over the extensive area from Marocco to the Indus, and from the coasts of the Indian Ocean to the Danube and the confines of Siberia, lies partly in the representation of the numerous sibilants. Some of these, too, are sounded in one way by Arabs and otherwise by Persians and Turks. The transliteration according to a recognised system, however, presents little difficulty in the consonants; it is in the vowel-accents and *tashdid*, so generally omitted in Arabic, that the difficulties of accurate transcription lie, and even this can be overcome by taking trouble. The following table presents the elements of transcription for Turkish, Persian, and Arabic:—

Letters.	Names.	Turkish.	Persian.	Arabic.	Sounds.
ا	Alif				is only a support for a vowel.
ب	Be	b	b	b	as in *babble, rub.*
پ	Pe	p	p		as in *puppy, sip.*
ت	Te	t	t	t	soft dental as in Italian, nearly as in *tube.*
ث	Se	ś	ś	th	Ar. nearly as in *thin*; Persian as *s* in *sister.*
ج	Jim	j	j		as in *jet, jam.*
چ	Che	ch	ch		soft *ch*, as in *church*, Italian *c* in *dolce*, etc.
ح	Ḥe	ḥ	ḥ	ḥ	a strong aspirate pronounced forcibly in the throat.
خ	Khe	ḳh	ḳh	ḳh	like *ch* in *loch*, or the Gaelic *ch.*
د	Dâl	d	d	d	soft dental as in Italian, nearly as in *dew.*
ذ	Zâl	ż	ż	dh	as in *zeal*; but rather as *dh* by the Arabs.
ر	Rĕ	r	r	r	as in *ran, bur.*
ز	Ze	z	z	z	as in English, like ذ in Persian.
ژ	Zhe	zh	zh		like *s* in *pleasure*, or *z* in *azure.*
س	Sîn	s	s	s	sharp *s.*
ش	Shîn	ſh	ſh	ſh	as *s* in *sure, session, shine* in *sh.*
ص	Sâd	ṣ	ṣ	ṣ	as in *sin.*
ض	Zâd	ẓ	ẓ	ḍ	
ط	Ṭâ	ṭ	ṭ	ṭ	a hard *t*, sounded with the tongue full against the front part of the palate, as in *true.*
ظ	Ẓâ	ẓ	ẓ	ẓ	*z* hard.
ع	'Ain		'	'	a guttural formed in the lower part of the throat.
غ	Ghain	gh	g	ġ	a peculiar hard guttural like the Northumbrian *r*, or the French in *grasseyé.*
ف	Fe	f	f	f	soft letter as in *fill.*

Letters.	Names.	Turkish.	Persian.	Arabic.	Sounds.
ق	Qâf	q	q	q	a very hard guttural sound stronger than *ck* in *thick*.
ك	Kâf	k	k	k	soft *k*, as in *king, kill*.
گ	Gâf	g	g		always hard, as in *good, give, dog*.
ڭ	Sagyr-nun	ñ			a nasal *n* in Turkish.
ل	Lâm	l	l	l	as in *lane, lull*.
م	Mîm	m	m	m	as in *mar, sum, map*.
ن	Nûn	n	n	n	as in *noon, ran, not, in ;* before *b* and *f*, it is sounded as *m*.
و	Vâu	w, v	v, w	w, v	between the sounds of *v* and *w* ; used also for the vowels *u* and *o*.
ه	He	h	h	h	soft aspirate as in *house, hit*.
ي	Ye	y	y, i	y	as in *year, yet, loyal* ; used both as a semi-vowel and vowel.
لا	Lam-elif	la			
ا ـَ		a	a	a	short *a* as in *America, rural* ; answering to Arabic *fat'ha*.
آ ا	Maddah	â	â	â	long *a* as in *ball, tar*.
اَيـ يـَي		ai	ai	ai	*i* in *nigh, fine, ai* in *aisle*, in grammar,—yâ-i-sâkin mâ qabl maftûḥ.
آوَ		au	au	au	as in *our*, in grammar,—wâv-i-sâkin mâ qabl maftûḥ.
ايـ يـِي		e	e	e	as *ei* in *neighbour* and in *prey*, yâ-i-maj'hûl.
ا ـِ	Kasr	i	i	i	*i* in *fin, sit*.
ئِ		i	i	i	same ; in grammar,—hamza-i-mulaiyana.
اِيـ يـِي		î	î	î	*i* in *marine, police*, yâ-i-ma'rûf.
او ـُ		o	o	o	as *o* in *bone*.
ا ـُ	Zamm	u	u	u	*u* in *full, put*.
او ـُو		û	û	u	*u* in *rule*, wâv-i-mårûf.
ـّ	Tashdid				doubles the letter it is placed over.
ـْ	Sukûn				The letter it is placed over has no vowel.

To carry out this much-needed spelling reform of geographical place-names, not merely in charts but in all maps, our first and most pressing need for each foreign country is *authoritative* indexes of all names (like those for Austria), printed in the alphabet of the country, whether Greek, Russian, Arabic, Japanese, Hindi, or Burmese, and, where necessary, with a transcription (liable to revision) into Roman characters. It would add to the value of such lists if pronunciation could also be represented in cases where the spelling does not quite convey it. These lists could only be drawn up in the countries to which each relates, and would require that the transcriptions should be revised by scholars in accordance with the transliterative systems adopted by international arrangement for each language.[1] Except to indicate the quantities of vowels in certain cases, diacritical marks could be dispensed with on maps and in ordinary books; in the standard indexes, they would be usefully retained.

For such works there appear to be considerable collections already in existence for some countries, but which may not be sufficiently known to cartographers. The following are mentioned in the American *Report* :—

For Austria there are official lists of the names of every town and village in each province of the empire. They are—

Special Ortsrepertorium von Steiermark; von Kärnten; von Krain; von Böhmen; von Tirol und Vorarlberg; von Küstenlande; von Mähren; von Schlesien; von der Bukowina; von Galizien; von Nieder Oesterreich; von Ober Oesterreich; von Salzburg. Geographisch-statistisches Repertorium der bewonten Orte im Königreich Dalmatien; Slovnik geografizny des Königreichs Polen und anderer slavischer Länder; Ortslexikon des Königreichs Polen; Ortschafts und Bevölkerungs Statistik Bosniens und der Hercegovina; Ortslexikon von Ungarn by Jekelfalussy; Postlexikon der Länder der ungarischen Krone; and Orstlexikon von Russland.

For Denmark, etc. :—

Statistisk-topografisk Beskrivelse af Kongeriget Danmark, ved I. P. Trap, Kjöbenhavn, 1879.

Uppdráttr Islands á fjórum blödum.

Den Grönlandske Ordbog af Sam. Kleinschmidt, Kjöbenhavn, 1871.

For Dutch countries :—

Woordenlijst van de Aardrijkskundige namen in Nederland van het Nederlandsch aardrijkskundig Genootschap, 2d druk: Amsterdam, C. L. Brinkmann.

Veth's Java.

Havenga's étappe kaart van Java, de residentie kaarten van Java, etc.

For Spanish-speaking countries :—

Don Pascual Madoz's Geographical Dictionary of Spain, 1845-50.

Señor Mariana's Dictionary of the Corporations (cities and towns) of Spain.

Riera's General Geographical Dictionary, 1880-85.

Spanish-American Encyclopædia (being published).

Spanish Universal Geography, 1830.

[1] Leaving the Armenian and Æthiopic out of account, there are practically only three alphabets extensively used—the Arabic, the Sanskritic in its various equivalent forms, and the Cyrillic (including its basis—the Greek)—for which transliterative equivalents have to be accepted; and these have been satisfactorily fixed for all geographical purposes by scholars and the Latinised alphabet of part of the Slovenik race.

Royal Historical Academy's Geographical Dictionary of Navarra, etc., 1802.
Don Jacobo de la Pezuela's Geographical Dictionary of Cuba, 1863.
Prof. Don Juan Vilanova y Piera's Vocabulary of Geographic names.
El Diccionario jeográfico de Chile, por F. S. Astaburuaga, New York, 1867.
Un uniforme pasado a la Universidad, por Don B. Vicuña Mackenna, in the Annals of the University, 1863.
Derrotero del Archipelago Filipino, 1879.
Diccionario Geografico de las Islas Filipinas, por Buceta y Brava, 1850.

For China, Japan, and Korea :—

Names of places on the China Coast and the Yangtse River, published by order of the Inspector-General of Customs, 1882.
G. M. H. Playfair's Cities and Towns of China, London, 1879.
A Concise Dictionary of the Principal Roads, Chief Towns and Villages of Japan, etc., by W. N. Whitney, M.D., Toyko, 1889.
A List of Korean geographical names, by E. M. Satow, 1884.
French-Korean Dictionary, with an appendix of geographical names, 1880.

We want similar materials for the place-names of Russia, Greece, Turkey, Egypt, Algeria, Arabia, Persia, India, Ceylon, Burma, Siam, Tongking, and Central Asia, etc.[1]

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.

EUROPE.

The Anthropology of Europe was the title of a Course of Lectures (The Rhind Lectures) delivered in Edinburgh last October by Dr. Beddoe, Ex-President of the Anthropological Institute of Great Britain, of which we have received the following brief abstract :—Dr. Beddoe, in his earlier lectures, dwelt chiefly on some of the problems of anthropology, briefly on the question of priority of dolichocephalic or brachycephalic types, briefly also on the great Aryan question, and at greater length on that of the influence of environment, towards modifying of types, to which he repeatedly referred during subsequent lectures. He noted the very frequent occurrence of broad, even very broad, skulls in conjunction with very narrow ones in some of the earlier, if not the earliest "finds," a circumstance not yet sufficiently explained. He showed that we knew very much more about the succession of races and the details of ethnography, where these related to Western Europe, especially to France, because these parts were inhabited, owing to the geological conditions, earlier than the north-eastern portions of Europe, while in the east and south-east generally, and in Spain, anthropological science was not sufficiently advanced, or political circumstances intervened, and investigators were few. With respect to the Aryan question, he pronounced no very decided opinion, though he spoke of certain doctrines on the original habitat as the Scandinavian and Lithuanian heresies : and he showed some inclination towards that

[1] A bibliography of the whole subject would be important. The following works are valuable :—Bender, *Die deutschen Ortsnamen* ; Förstemann, *Die deutschen Ortsnamen* ; Buttmann, *Die deutschen Ortsnamen* ; Vilmar, *Ortsnamen in Kurhessen* ; Piderit, *Ortsnamen in Niederhessen* ; Meyer, *Ortsnamen des Kantons Zürich* ; Finnson, *Islands Landnamabok* : Edmunds, *Names of Places* ; Skene, *Celtic Topography of Scotland* in *Trans. R. Soc. Edin.*, vol. xxiv. pp. 207-220 ; Fergusson, *River Names* ; J. Macdonald, *Place-names of Strathbogie* ; Robertson, *Gaelic Topography of Scotland* ; P. W. Joyce, *Irish Local Names* (two series) ; *General Alphabetical Index to the Townlands and Towns, the Parishes and Baronies of Ireland—Census* 1861 ; Professor J. J. Egli's articles, *Ueber die Fortschritte in der Geographischen Namenkunde* in Wagner's *Geographisches Jahrbuch* ; *Nomina Geographica Neerlandica*, uitgegeven door het Nederl. Aardijkskundig Genootschap.

view which looks on the Galchas as representing the ancestors of the Iranians and of the people who brought the Aryan languages into Europe, in which case the brachycephals of the central mountain chains, the Carpathians with the Balkans, Bohemian mountains, the Alps, Jura, Vosges, Cevennes, etc., may be looked on as retaining much of the original Aryan blood, seeing that their physical characteristics have a general resemblance to those of the Galchas. He discredited the argument that because the Aryan-speaking inhabitants of Europe were more numerous than those of Asia, it was much more easy to derive the latter from the former, the less from the greater, than *vice versâ*, remarking that on the same principle we should derive the English from North America, and the Portuguese from Brazil, and that it was not at all unlikely that about the dawn of history, when Asia was thickly and Europe comparatively thinly peopled, the proportions were quite different, especially as at that time the Iberians were still unorganised as to language. With regard to the influence of environment he quoted Kollmann of Basel's five types :—

1. Long-headed long-faced, the Grave-row or Germanic, etc.,
2. Broad-headed long-faced, the Disentis or Sarmatic,
3. Long-headed broad-faced, the Cro-Magnon,
4. Broad-headed broad-faced, the Turanian,
5. Mesocephalic broad-faced,

but said he thought the types too few and the limits too absolute and precise as to figures.

He showed the extreme divergence of views on this subject of environment,—noting how Kollmann denied any change of types, or material progression therein, since the period when we knew anything of man in Europe, saying that man was fit for anything when he first appeared here, and that for the establishment of permanent varieties we must look further back, perhaps even into the Miocene age.

On the other hand, Schaaffhausen, Ranke, and to a less decided extent perhaps Virchow himself, assign very great importance to environment : the first indicates a large number of points of inferiority as occurring together or separately in the old dolichocephals, and believes that in Germany, if not elsewhere, heads are gradually growing broader with increasing intelligence and civilisation, while Ranke thinks that in Bavaria, in some unexplained way, the inhabitation of mountain regions has a tendency to broaden and shorten the head, and that, where race concurs with environment, as in the once-Slavonic hill country of Upper Franconia, the tendency is still more marked, as from a double influence. Dr. Beddoe then went briefly through the history of the successive expansions and "swarmings" or migrations of the several races who have successively been active in Europe,—the Phœnicians, the Greeks, the Gallo-Kelts, the Romans, the Germans, the Slavs, the Saracens, and the Turco-Tartar tribes, and their share in modifying race-distribution.

Proceeding to consider the history and ethnology of Russia, he stated his opinion that the Scythians, if not altogether Turanian, were a mixed race into which a Turanian element entered, and who ruled over other tribes of different descent from themselves. The ancient skulls had not been found or preserved in great number, but they were almost all long, up to the Slavonic period, when they became rather broad, very much what they are at the present day. The Merians around Moscow were a Finnish tribe, who about the tenth or eleventh centuries were being subdued or incorporated by the encroaching Muscovites, and who finally disappeared ; they were tall and strong, but pacific in habits, and, though they had commerce with the Arabs and Bulgarians, were comparatively poor. The history of Russia was one of the gradual absorption of Finnish tribes, interrupted for a long period by the great invasion and domination of the Mongols of the Golden Horde. The numerous

Finnish tribes seemed to have something common in their physiognomy, but differed very much in their indices of head-breadth, and also to some extent in complexion, some having dark hair, others to a large extent fair or brown, and some a large percentage of red hair, *e.g.* the Votiaks and Voguls, who are incorrectly said to be all red-haired.

Dr. Beddoe thought the Illyrians probably furnished the principal source of the black-haired folk in the Balkan Peninsula; they were also broad-headed. He entered into some details as to the changes in the Greek type and the history of the Thracians, as well as of the colonisation of Bulgaria by the people who now bear that name.

With regard to Scandinavia he quoted the discrepant views of Montelius and Aspelin, the former doubting or denying the arrival of any new race since the neolithic period, the latter tracing the true Swedes to the Rhoxalani (Red-men in Finnish), whom he supposed to have entered Sweden about the fourth or fifth century.

In treating of Germany he entered pretty fully into the question of the change which appears to have taken place in the physique of the Bavarians and Swabians since the Marcomanni and Alemanni occupied these countries, quoting the different opinions of Von Hölder and Ranke on the subject, and especially the investigations of the former at Ratisbon.

In France and Belgium the clearest and most conclusive mass of anthropological fact was supplied by the investigations of Vanderhindere and Houzé into the colour, head-form, stature, etc., of the Belgians. A line drawn east and west between the Flemings and Brabanters and the Walloons separated two races differing in language, colour, stature, head-form, and length of nose, and that in the sharpest manner. In France Dr. Beddoe also mentioned the inquiries of Broca and Boudin into stature, of Topinard into colour, and of Collignon into head-form, and their remarkable results; and in Spain those of Don Telesforo de Aranzadi y Unamono, into the physical characteristics of the Guipuzcoan Basques, whom he believed not to be a pure race, but a mixture of three distinct elements. In Italy he showed how the stature and the head-breadth decreased gradually from north to south, and how the Sards were probably the purest breed in Europe, and the best representatives of the Mediterranean or southern race: also how closely the modern seemed to resemble the ancient Romans. In Britain he selected for special remark Pembrokeshire and the Isle of Man, and analysed the indications of stature, colour, and head-form in the Manxmen, who were a cross-breed between the Gael and the Norseman in all these respects. In Scotland he selected for special remark the people of Berwickshire and of Ballachulish, showing that, though not very dissimilar in head-form, they were strongly distinguished in colour of hair. He expressed his belief in the presence of a Finnish or Ugrian element in the population of Scotland, which was also found in Wales, and was marked among other characteristics by oblique eyes. The Iberian element, which had doubtless been strong among the Picts, continued to be so in many parts of Scotland, for example in Wigtownshire and the upper part of Aberdeenshire, and in a great part of the Highlands.

The concluding part of the last lecture was devoted to an appreciation of the three (or, counting the Finns, four) great races which now divide Europe, of which the central, Alpine, brown, thick-set, broad-headed race seems the one most likely to spread at the expense of its neighbours. The question of race *versus* environment was also summed up, to the advantage, on the whole, of the former.

Lake of Geneva.—A complete series of soundings has been taken over the whole bed of this lake, and a report is given in *Cosmos*, vol. x. No. ix., by the engineer.

M. A. Delebecque. The length of the lake is 45 miles and its greatest breadth 8½ miles. Its area is 223 square miles, and the height of its surface above sea-level about 1230 feet. The bed of the lake is divided into two distinct parts, the Great Lake between Yvoire and Villeneuve, and the Little Lake between Yvoire and Geneva. The bottom of the Great Lake is nearly level over an area of 17¾ square miles, and lies at a depth of 169 fathoms. The slopes are more sudden at the eastern end, where the mountains descend more precipitously to the water, the inclination being 48 degrees between Saint-Gingolph and Bouveret, and 56 opposite the Castle of Chillon. The river Rhone has made a deep channel, lined with dykes, in the bottom of the lake. This channel extends in a tortuous course for a distance of 3½ miles from the mouth of the river. Near its commencement it has a depth of 190 feet, and beyond Saint-Gingolph it is still 30 feet deep, where the depth of the lake is 109 fathoms. Its formation is due to the large quantities of alluvium brought down by the Rhone, and to the lower temperature of its waters, which causes them to flow under the waters of the lake. The Dranse, which brings down gravel and stones, as well as mud, to the lake, has formed what is known as a *torrential* delta at its mouth, in the form of a cone, continually advancing further and further into the lake. The Little Lake consists of four depressions, separated by bars of small elevation, projecting from the points of Nernier, Messery, Hermance, and Bellerive. The depths of these basins are 249, 229, 229, and 164 feet, respectively. At the bottom of this portion of the lake are to be found traces of the passage of the ancient Rhone glacier which extended to Lyons. The bar of Nernier, or at least its upper surface, has at one time formed part of a moraine. A bathymetrical map accompanies the article from which this note is taken.

Nijni Novgorod.—The fair last year was tolerably successful. The diminution in the demand from the home provinces was counterbalanced by large purchases for Central Asia. Improvements in the dyeing of cotton goods has led to increased importation into Persia. A marked feature of this fair was the large quantity of excellent cotton produced in Asia. The trade in furs was less brisk. Many of the more valuable furs, such as ermine, bear, squirrel, etc., which are chiefly bought by foreign merchants, have risen 15 to 30 per cent. and more in price. Black fox and Kamtchatka beaver are nearly double their former price, owing, in the case of the latter at any rate, to the growing scarcity of the animal and the increased demand for the skin. Tea and Caucasian wines did not find a very good market. The trade in the former article, and especially of sea-borne tea, was unfavourably affected by the fluctuations in the rate of exchange. Though the wines were of superior quality, the preceding vintage having been excellent, and though the quantity brought to the fair was less than in 1890, a considerable portion was left on the hands of the producers. Moscow was, as usual, the principal purchaser.—*Revue Française et Exploration*, Nov. 15, 1891.

ASIA.

The Census of India.—The following tables are extracted from the preliminary report published in the *Statement exhibiting the Moral and Material Progress and Condition of India during the year* 1889-90. The first table, relating to British Territory, is complete with the exception of the small Trans-Himalayan subdivision of the Punjab and of British Baluchistan. In the second, Manipur, Sikkim, Baluchistan, and the Shan States do not appear, nor have returns been received from Banswara in Rajputana, parts of Kashmir, and most of the Chota Nagpur feudatories.

PRELIMINARY TOTALS. BRITISH TERRITORY.

PROVINCE.	Area in sq. miles.	POPULATION. 1881.	POPULATION. 1891.	Variations per cent. since last Census.
Madras,	143,345	30,812,745	35,588,850	+ 15·50
Bombay and Sind,	125,393	16,469,199	18,825,080	+ 14·30
Bengal,	149,725	66,589,553	70,909,260	+ 6·49
N.-W. Provinces and Oudh,	106,111	44,107,869	46,922,690	+ 6·38
Punjab,	111,016	18,843,186	20,803,000	+ 10·40
Ajmir-Marwara,	2,711	460,722	541,890	+ 17·62
Central Provinces,	84,445	9,838,791	10,761,630	+ 9·38
Berar,	17,711	2,672,673	2,896,670	+ 8·38
Coorg,	1,583	178,302	172,630	3·18
Assam,	46,307	4,881,426	5,416,510	+ 10·96
Lower Burma,	87,130	3,736,771	4,569,170	+ 22·27
Upper Burma,	69,012	..	2,984,730	..
Total, *Continental*,	944,489	198,591,237	220,392,110	+ 9·48
Aden and Perim,	13?	34,860	41,910	+ 20·22
Baluchistan Cantonments, etc.,	10?	..	26,880	..
Andaman Islands (Port Blair),	12?	14,628	15,670	+ 7·12
Laccadive Islands,	80?	14,473	14,410	0·44
Total, *Dependencies*,	115	63,961	98,870	+ 12·55
TOTAL, British Territory,	944,604	198,655,198	220,490,980	+ 10·99

PRELIMINARY TOTALS. FEUDAL TERRITORY.

STATE OR AGENCY, ETC.	Area in sq. miles.	POPULATION. 1881.	POPULATION. 1891.	Variation per cent. since last Census.
Hyderabad,	81,807	9,845,594	10,458,930	..
Baroda,	8,570	2,185,005	2,414,200	+ 10·49
Mysore,	24,723	4,186,188	4,859,760	+ 16·09
Kashmir,	80,900	1,534,972	2,507,240	..
Rajputana,	129,750	10,268,392	12,089,330	+ 17·73
Central India,	75,079	9,261,907	10,139,570	+ 9·47
Bombay Feudatories,	69,045	6,926,464	8,059,760	+ 16·36
Madras Feudatories,	9,475	3,344,849	3,673,370	+ 9·82
Bengal Feudatories,	37,515	2,947,308	2,709,750	..
Central Province Feudatories,	28,834	1,709,720	2,155,490	+ 26·07
N.-W. Province Feudatories,	5,125	741,750	799,160	+ 7·74
Punjab Feudatories,	38,299	3,860,761	4,256,670	+ 10·25
TOTAL, Feudatory Territory,	589,122	56,812,910	64,123,230	+ 12·87

In calculating the increase per cent. in Continental British Territory the population of Upper Burma is not taken into account, nor is that of the Baluchistan Cantonments among the Dependencies, but both are included in the calculations for the whole British Territory. The deficiencies in the second table render the total for India of little use. Should the whole population prove to be, as estimated, just under 286 millions, the increase per cent. will be about 11·8, the population in 1881 being given as 255,689,178. The following towns have a population of more than 200,000:—

	1881.	1891.	Variation per cent.
Calcutta and suburbs,	741,600	840,130	+ 13·29
Bombay and Island,	773,200	804,470	+ 4·04
Madras,	405,850	449,950	+ 10·87
Lucknow,	261,300	272,590	+ 4·32
Benares,	199,700	222,420	+ 11·38
Hydrabad (Deccan),	354,960	392,730	+ 10·65

The towns which show the highest rate of increase are Mirzapur, 46·61 per cent.: Ajmir, 39·26: Rawal Pindi, 38·66: and Rangoon, 35·05.

The Great Earthquake in Japan.—Some definite information has at length been received concerning this fearful calamity (*The Times*, Dec. 8th). The movement was distinctly felt as far as the northern extremity of the island, 400 miles from the origin, and at Tokio, 170 miles distant, the shock was the most violent experienced since the establishment of the Observatory in 1874, but very little damage was caused. The centre of the disturbance was, as nearly as can be ascertained at present, 12 miles from Gifu, where a large area is reported to have subsided bodily and to have undergone other great physical changes. The area of maximum devastation is contained in the provinces of Mino and Owari, but death and destruction of property were by no means confined within these limits. No instrumental records of the phases of the phenomenon exist, for observatories and instruments were overwhelmed in the general ruin. According to the statements of the survivors, it began, without any previous warning, at about 6.30 A.M. on October 12th, with two shocks in quick succession directed eastward, followed immediately by a still stronger return-wave to the west. This third shock is said to have caused most of the damage, though the slighter shocks which succeeded, and of which upwards of 6000 were felt in Nagoya during the 206 hours after the first outbreak, helped to complete the ruin. One observer claims to have determined a vertical motion of 8½ inches and a horizontal motion of 1 foot: but this statement must be received with caution. Professor Milne states that the experience on this occasion confirms an idea he has long entertained, that vertical movement indicates that ocean-like waves are passing along the surface of the Earth. To determine this motion the distance between the crests of the waves should be measured, for which a new set of instruments must be devised. A curious feature observed in Nagoya is the heaping up of the tiles in waves with their crests lying north and south—that is, at right angles to the direction of the shocks. The Nagoya-Gifu plain, where the disturbance was most violent, is a basin of hard rocks filled with soft alluvium. Possibly by the release of steam, perhaps by an unsuccessful effort to form a volcano, this rocky basin was set in vibration, and the less consistent materials were agitated by a rapidly recurring series of waves. The country, being very fertile, is very thickly populated, the density being 500 to 800 per square mile. In all about half a million of people lived on the 1200 square miles where the effects of the earthquake were most disastrous. Of these 8000 lost their lives, and most of the remainder are injured or reduced to a state of destitution. 40,000 houses have fallen. These numbers may, however, prove to be far below the mark, when more accurate information is obtained. Gifu, a busy manufacturing town of 30,000 inhabitants, is a mass of ruins, a large part of the destruction being due to fire. The whole region about Gifu and Ogaki bears the marks of fearful convulsion. Railway bridges have been destroyed and railway lines twisted, factories and other stone buildings have all been thrown down, and great fissures, some of them as much as six feet wide and twenty deep, may be observed in the ground. Nagoya, the fourth city of Japan, with a population of 162,000, has also suffered terribly, and even at Osaka, some 80 miles from the centre of the disturbance, several lives were lost and some damage was done to property.

Population of Singapore.—According to the last census the population is about 184,000. The majority are Chinese (122,000), and then follow Malays (36,000), and Hindus (16,000). There were, in April 1891, only 5254 Europeans on the island, and of these only 2303 were permanently settled civilians.—*Deutsche Rundschau*, Jahrg. xiv. Heft 2.

Sarawak.—The British Consul at Brunei has recently paid a visit to this State. Kuching, the capital, he describes as a model of cleanliness and good order. Muka

is the centre of the sago industry, and at Busoh, in Upper Sarawak, there are extensive antimony-works, while at Paku the Chinese extract gold. Throughout Upper Sarawak there are experimental Government plantations, where pepper, tea, and coffee are doing well, but tobacco is a failure. A considerable timber trade is carried on along the Rejang, the largest river of the State, which is navigable to a distance of 160 miles from the mouth for vessels drawing seven feet of water. The foreign trade amounted in 1890 to four and a half million dollars, the chief articles of export being sago, flour, gutta-percha, pepper, rattans, and gambier. The general impression left by the report is that of a well-ordered, peaceful, progressive State, with light taxation, and an expenditure well within the revenue.—*The Times*, Oct. 12, 1891.

AFRICA.

Sierra Leone.—The frontier, as determined by the Commission, runs between the rivers Mellacori and Grand Scarcies, and then between Benna and Tambakka, leaving Talla on the English, and the Tamisso on the French, side. From there it proceeds to the 10th parallel of N. lat., leaving Sulimana and Falaba to the English and the country of the Hubu to the French.—*Globus*, Bd. lx. No. 21.

Somál-land.—Signor Brichetti-Robecchi has made another expedition to the great Eastern Horn of Africa, and has this time succeeded in passing through the interior from Obbia to Berbera. Accounts of the difficulties he experienced and of the events of his journey are contained in letters to the Italian Geographical Society (*Bollettino*, vol. iv. fasc. 10). After rounding Cape Guardafui in the *Paraguay*, he encountered very stormy weather, and, being unable to land at Athale, went down to Zanzibar. Having turned back again, the *Paraguay* went aground, and a large part of Signor Robecchi's equipment was thrown overboard to lighten the vessel. At length he landed at Makdishu, and made his way after many difficulties and dangers to Obbia. Here, as elsewhere, he was warned against an attempt to penetrate into the interior, and the Sultan Yusuf Ali refused to render him any assistance. Signor Robecchi succeeded, however, in collecting a small caravan of thirty men and fifteen camels, and marched in a north-westerly direction, through the Rer Nehmala, Rer Jalaff, Rer Saliban and other tribes, till he arrived among the Merehan Somál. Here he turned to the south-west, and regained the territory of the Hawiyeh Somál at the river Webi, in 4° 30′ N. lat. approximately. A march along the river for some sixty miles brought him to the neighbourhood of Barri, already visited by James. It was Signor Robecchi's intention to advance still further along the river, but the chief of the Webi Shebeli warned him that the Abyssinians would certainly use all the means in their power to hinder his progress. Moreover, there was war among the tribes, and his men flatly refused to follow him. He was, therefore, obliged to choose another route, and, directing his course to Faf, he reached Warandab by the valley of the Fafan on August 11th. Prince Eugenio Ruspoli, whom he met here, repeatedly advised him not to approach Harar, and, on reaching Een, the most important religious centre of the Somál country, he heard such alarming accounts of the proceedings of the Abyssinians, that he thought it wiser, knowing also their hostile feeling towards Italians, to direct his course through Milmil to Berbera. Signor Robecchi has brought back mineralogical, botanical, and entomological collections.

Mombaza to Kilima-njaro.—In *Petermann's Mitt.*, bd. 87, No. xi., Dr. Hans Meyer describes the route from Mombaza to the Kilima-njaro district. Though running through dry and uninhabited country, it is shorter than the routes from Pangani, Tanga, and Wanga, and is much frequented by small caravans. The

conformation of the land is exceedingly monotonous. Except the Taita Mountains no elevations of importance occur, but everywhere extends an immense flat, or slightly undulating, plain. A few hills rise up from the narrow strip of lowland by the coast, which is intersected by numerous creeks, some of them reaching to the edge of the plateau and receiving the rivulets which drain the adjoining country.

The Voi River, which enters the sea at Kilifi, is the only stream from the interior which reaches the coast: all the other brooks of Taita are lost on the steppe. From the littoral the edge of the plateau has the appearance of a long chain of heights, but, after ascending about 520 feet at Rabai, the traveller looks over a boundless plain. The first round sandstone hills, at Taro, are reached after four days' march, and two days later the first gneiss hills, at Maungu. These, as well as the Ndara Mountains and the Bura further westward, rise with steep flanks directly from the plain. Of the Taita Mountains only the Ndara, Bura, and Kadiaro have sufficient water for the needs of a fairly dense population (Wataita). Elsewhere water is found only in rocky pools, whence the few natives and the caravans draw their supplies. These pools probably owe their formation to glacier action. The Taita Mountains consist of five ranges, Maungu 5 miles long, Ndara 8½, Mbululu 7½, Ndi 5, and Bura 13½. Maungu has nine rounded summits, between the fourth and fifth of which the caravan route ascends to a pass 2388 feet high. The seventh is the highest, its elevation being about 3380 feet. Ndara, with its five summits, has no large valleys or brooks of any importance. Bura consists of two ranges, separated by the Bura River, of which the eastern is the loftier and more massive, containing among its eight summits the Ruma, 7050 feet high. The Bura River and the Matate, which drains the eastern slope, lose themselves on the plateau, but the Ore or Voi, which rises on the northern side, and is reinforced in the rainy season by the Ndi River, as already mentioned, reaches the sea.

This region lies in the southern Tropical Zone and in the path of the monsoons, and its climatic conditions are determined by this position. South-east winds blow from May to December, and north-west winds from January to April, and rain falls in March, April, November, and December. At the coast, and in the mountain groups of Ndara and Bura, local meteorological conditions obtain, and Taveta is affected by the neighbouring Kilima-njaro. Dr. Meyer gives a table of observations taken during his journeys to Kilima-njaro. Five zones of vegetation may be distinguished. The first extends over the low coast-land to the edge of the plateau, and is characterised by banyans, tamarinds, mangroves, coco-nuts, bananas, manioc, and sorghum. The second, nearly coinciding with the carboniferous region, extends to beyond Taro: its forms are smooth and stiff-leaved plants, such as laurels, mimosa, *Euphorbium*, and dwarf palms. The third zone ends at the Maungu Mountains, and is marked by thorny bushes, *Gardenia* and *Testudinaria*; grass is absent. The fourth is very extensive, spreading far into the interior; here are found scattered mimosa, baobabs, low thorny bushes, and tall grass. Lastly, the high, moist mountain tracts constitute the fifth zone, where grow forests of silk-cotton trees, teak, sycamores, and raphia palms, oranges, sugar-cane, maize, sorghum, beans, and potatoes. The agricultural value of the country Dr. Meyer regards as small, for only the narrow strip of coast-land is adapted for plantations, the fertile mountain country of Taita lying too far inland, while the rest is of little value owing to the absence of water. A map accompanies Dr. Meyer's article.

AUSTRALIA.

Australia.—Our Hon. Correspondents in Australia have sent us accounts of a journey made by Mr. Joseph Bradshaw to ascertain the agricultural capabilities of North-east Kimberley, between Cambridge Gulf and the Prince Regent River.

The explorer landed at Wyndham, Cambridge Gulf, on the 9th of March last. This settlement, built of wood, had been destroyed two days before by a violent hurricane. Such gales are fortunately rare. On the 15th, Mr. Bradshaw and his party crossed the King River, and on the two following days wandered round Mt. Cockburn. Near the Pentecost River they saw large numbers of natives, and a few days later crossed the Forest and Drysdale Rivers, the former 100 yards broad and deep enough to take a rather small horse off his feet. Both these rivers are fine streams, but run through poor, unprofitable country. From the Drysdale westwards the route led for several days through open level country, with fairly good grass and forests of box, bloodwood, and cypress. Occasionally *Bauhinia* and a species of beefwood were observed. Kangaroos, emus, and wild turkeys were plentiful. About eighteen days after crossing the King River, Mr. Bradshaw came to a low abrupt range of porphyritic rocks, and, passing through a gorge, entered a country with a rich heavy loamy soil covered with nutritious grass. Through this country they travelled for three days, and, finding a creek running to the north-west, followed it until it entered a precipitous ravine winding through a rugged sandstone range. Four days were spent in searching for a pass, and the axe and handspike were brought into use in order to render the steeper portions of the track accessible to the horses. Shortly after leaving the mountains the party reached a river, which was afterwards ascertained to be one of the principal tributaries of the Prince Regent River, its confluence being near the limit of the tidal water. The land on both sides the stream was rich, though thickly strewn with basaltic boulders, and covered with heavy grass. The camp being pitched, Mr. Bradshaw and Mr. Allen took a ride to the south-west, past a large flat slab of sandstone rock on which stood a circle of stones, a sacred place of the natives, to a mountain 1550 feet above sea-level, whence they could survey the country for many miles around. The following day the party, keeping to the western bank of the river, marched 15 miles to the north, where again a formidable barrier of sandstone rock barred the way. The stream, before entering the chasms of this range, is very wide in places, and has a swift current. It was calculated that about 11 million gallons of water flowed per hour past a given point. The sandstone barrier was followed to a place where a creek fell into a chasm 95 feet deep. Half a day was spent in getting the animals across the range, though it was not more than half a mile broad. The valley by which the party issued was closed by an old stone wall four to five feet high. At noon on the same day the latitude was determined as 15° 50′, approximately, and the estimated longitude was 125° 40′. Porphyry and sandstone ridges, running usually from north-west to south-east, were now frequently crossed. In order to avoid the difficulties of the country, the party often preferred to follow the winding course of the river, here generally passing through rich alluvial flats. But about five miles from its junction with the Prince Regent the river again enters a gorge. This one, named by the party Nigger Gorge, from the number of natives seen in the neighbourhood, is nearly a mile long, and is enclosed by walls 400 feet high. The Prince Regent is, at the confluence, about 65 yards broad, and appeared to be very deep at most places. Mr. Bradshaw followed it upwards for five days, as far as a gorge in an inaccessible range. Numerous caves were found in the rocks, the walls of which where adorned with paintings, some of the human faces being of an aquiline type, different from that of the natives of the neighbourhood. A curious feature of the Prince Regent River is that for more than 50 miles of its course it forms the line of demarcation between two distinct kinds of rock. On the eastern side the formation is basaltic, on the western sandstone. The former country is lightly timbered and, for the most part, grassy, while the latter produces little else than *Spinifex* and black oat grass. Parties sent out toward-

the Glenelg found no change in the character of the country. Towards the Roe River extensive table-lands of basalt were found, with large creeks flowing through stony valleys to join the Prince Regent. The timber is principally box, white gum, *Bauhinia* and lancewood. Having satisfied himself of the adaptability of this part of the country for pastoral purposes, Mr. Bradshaw returned to Cambridge Gulf.

Australia: the Elder Expedition.—The Adelaide *Telegraph*, Oct. 17th, 1821, reports that Mr. Lindsay has led his party to Esperance Bay, on the south coast, instead of to the Murchison River. The country to the west of the South Australian border he reports to be sand-hills and sand-plains, covered with *mulga* and grass and a good deal of *Spinifex*. Between the Barrow Ranges and Queen Victoria Springs, which are unworthy of the name they bear, much the same kind of country was traversed. An immense gum forest was passed through, but *Spinifex* and bushes covered the ground, and neither grass, animals, nor birds were to be seen. No minerals have been procured, but 10,000 specimens of plants have been collected. After a rest the party was to proceed to the north and north-west.

MISCELLANEOUS.

Mr. Fred W. W. Howell has ascended the **Oraefa Jökull**, 6345 feet high, in the south of Iceland.

By treaties made with the chiefs of Addo, Igbessa, and Ilaro, these three districts, on the western frontier of Yoruba, have been added to the **British Protectorate of Lagos.**—*Tour du Monde, Nouvelles Géogr.* p. 375, 1891.

Heer J. W. Meerburg landed at Reo, in Mangarai, in April last, and **Crossed Flores** to Nanga Ramo. He found it a very mountainous country. Only one other traveller, Albert Colfs in 1880, has crossed the island.—*Globus*, Bd. lx. No. 20.

The Indian Meteorological Department has commenced a new periodical—the **Monthly Weather Review.** It is intended to take the place of the *Annual Reports on the Meteorology of India*, which have hitherto been issued about fourteen months after the termination of the year to which they referred. We have received the first four numbers (January—April) of the new *Review.*

On October 18th, 1891, a **Subterranean Crater** formed a temporary island about two miles to the west of the island of Pantelleria. Soundings taken by Professor Ricco of Catania proved that the crater lay at a considerable depth below the surface. Pantelleria has been elevated on the side towards the eruption. The same phenomenon occurred in 1831, and again in 1881.– *Globus*, Bd. lx. No. 22.

The Verein für Erdkunde zu Leipzig has issued a collection of essays under the title **Beiträge zur Geographie des festen Wassers.** The authors discuss the limit of snow in South America and Mexico, the fall of snow in the Arctic regions, the effect of drift ice on the formation of the ground in the Polar regions, the conditions of snow and ice on Kilima-njaro, and the literature of beach-lines and terraces.

In 1888 the Harvard College Observatory established the **Highest Meteorological Station in the World**, at Vincocaya in Peru, at an elevation of 14,600 feet above the sea. Vincocayo lies on the line of rail between Mollendo and Puno, in a pass of the mountains, and is less favourably situated for observations than Puno, where also a station was established on a plain 12,500 feet above the sea. It is expected that work will shortly be resumed here under a more complete system.—*American Meteor. Journal*, June 1891.

Professor Russell states that **Mount Elias** cannot be less than 15,000 feet high, having during his late expedition (S. G. M., vol. vii. p. 444) ascended the mountain to an elevation of 14,500 feet (*Globus*, Bd. lx. No. 19). Should this estimate be confirmed, Mount Elias will even then not be restored to the position of the highest summit of the northern part of the continent, Mount Wrangell being somewhere about 17,500 feet. Assuming Professor Heilprin's measurements in Mexico to be correct, the culminating point of the whole continent of North America is the peak of Orizaba, and Mount Wrangell and Popocatepetl are rivals for the second place. On p. 100 of vol. vii. there is a misprint in the height of the Nevado de Toluca: it should be 14,454 feet.

The Grönländischer Handel, being unable to spare room in their vessels for the transport of Dr. Drygalski's equipment, the expedition announced in the *S. G. M.* vol. vii. p. 100, has had to be postponed. **Dr. Drygalski**, however, started for Greenland last May, in order to make a preliminary survey of the ground and select a suitable site for his station. He found that the *nunatak* between the Great and Little Karayak Glaciers possesses peculiar advantages as a basis for the investigation of glacial phenomena. Measurements taken at the Itivdliarsuk Glacier showed that the pinnacles at its edge advanced over 30 feet in 24 hours, and at the middle as much as 50 feet, while a point at the distance of two miles from the extremity moved only 13 feet in the same time.—*Verh. der Gesell. für Erdkunde zu Berlin*, xviii. No. 8.

NEW BOOKS.

Early Travellers in Scotland (1295-1689). Edited by P. Hume Brown, Author of *The Life of George Buchanan*. Edinburgh: David Douglas, 1891. Pp. xxvi + 300. *Price* 14*s*.

Mr. Hume Brown's collection of the notices of Scotland contained in the works of early travellers is a valuable contribution both to the social history and to the historical geography of the northern kingdom. As the editor says in his modest preface, it throws light on certain aspects of Scotland and its people, which lie outside the beat of the ordinary historian, and which, it may be added, are still further beyond the ken of the ordinary geographer. The period covered by the volume extends from 1295 (King Edward the First) to 1689 (Thomas Morer, minister of St. Ann's, Aldersgate, and chaplain to a Scotch regiment); and the contributions drawn upon include, besides the English king referred to, a pope, a foreign ambassador, and several poets, knights, clergymen, and private gentlemen. The contributions are of diverse value and interest. Some of the writers are appreciative and sympathetic, like Moryson, Franck, and Rocheford; some are depreciatory and satirical, like Weldon, Brereton, and Kirke; while some, like Froissart, Tucker, and Morer seemed to have aimed merely at being instructive and accurate. Of all these writers, Thomas Morer, as the editor truly says, stands first in historical value, though he stands last in point of time. Nevertheless, one can enjoy without resentment the plain speaking and the caustic humour of such writers as Brereton, Kirke, and Ray, on account of the grains of truth that may be found even in their bushels of exaggeration.

There is great similarity in the routes followed by successive travellers. Most of them made the grand tour, which started from Berwick-on-Tweed, on the eas

coast, and made its exit at Carlisle on the west, the chief places visited being Edinburgh, Linlithgow, Stirling, Perth, Dundee, Aberdeen, Glasgow, and Ayr. A few penetrated as far as to Inverness, and traversed in the return journey the wild Highlands, which figure in their minds as *la sauvage Ecosse*. The sameness is not altogether a disadvantage, as the places mentioned are the principal towns in Scotland; and it is interesting as well as instructive to compare the remarks on the same places of different writers at different times.

One of the most interesting features of the successive narratives is the light they throw on the forms of place-names at different periods. Edinburgh, for example, appears as "Edenbrough" in the narrative ascribed to Edward I.; as "Ennebroc" and "Lislebourg" in the extract from Estienne Perlin, the latter being the name by which French writers of the sixteenth century habitually designate the Scottish metropolis. Linlithgow appears as "Lunsta," "Lansen," "Lithko," "Lythko," "Lescow," "Light-Goaw," and "Lynlithquo." Stirling appears as "Estrevelyn" and "Strevelyn." Perth is known as "Saynt Johns," "Saint John of Perte," and "Saynte Jhons Towne." Dunfermline is "Donffremelyne" and "Domfarmelin." Dumbarton is "Dumbertayne" and "Domberterand." Berwick is "Barwyk," "Barwik," "Berwike," and "Barwyke." Montrose is "Monorous" and "Monrosse." Aberdeen is "Dabberden" and "Aberdyne." Elgin is "Deigm" and "Elgen"; and Brechin appears as "Breghan," "Brichan," and "Breckin." Most of these varieties are obviously due to the phonetic peculiarities, not to say the phonetic blunders, of the travellers.

It must be said that the criticisms and comments of some of these foreign observers on the habits and the manners of the Scottish people are very far from being complimentary. The citizens of Edinburgh, according to Sir William Brereton, were "most sluttish, nasty, and slothful people." He never came to his lodging, or went out, "but I was compelled to hold my nose, or to use wormwood or some such scented plant." Richard Franck speaks contemptuously of "dirty Dumblain." Thomas Kirke remarks on "the stinks of their towns and the steams of their nasty inhabitants." According to Æneas Sylvius (Pope Pius II.) "the common people are poor and destitute of all refinement"; and they begged at the church doors almost in a state of nakedness. The houses in the villages and rural districts were built with stones without lime. They were roofed with turf, and Franck remarks that the sheep grazed on the top of them, where there was hardly grass enough to graze a goose on. Thomas Morer is more discriminating. According to his account, "the houses of their quality are high and strong, and appear more like castles than houses, made of thick stone walls with iron bars before their windows; but their vulgar houses, and what are seen in the villages, are low and feeble." He thus continues—"Their walls are made of a few stones jumbled together without mortar to cement 'em: on which they set up pieces of wood meeting at the top, ridge-fashion, but so order'd that there is neither sightliness nor strength; and it does not cost much more time to erect such a cottage than to pull it down. They cover these houses with turf of an inch thick, and in the shape of larger tiles, which they fasten with wooden pins, and renew as often as there is occasion; and that is very frequently done. 'Tis rare to find chimneys in these places, a small vent in the roof sufficing to convey the smoak away. So that, considering the humility of those roofs, and the gross nature of the fuel, we may easily guess what a smother it makes, and what little comfort there is in sitting at one of their fires." Kirke (1679) describes the people as "proud, arrogant, vainglorious, boisterous, bloody, barbarous, and inhuman butchers"; and, in proof of their cruelty, he says that in some places it is a common custom to cut a steak from the living cow. According to John Ray (1662), the Scots were not very

cleanly in their houses, and were but sluttish in dressing their meat. They had neither good bread, cheese, nor butter; and Morer tells a similar tale. Ray adds that their way of washing linen-cloths was "to tuck up their coats and tread them with their feet." Only the upper half of the windows was glazed. The lower half was fitted with wooden shutters. As to dress, the women, who "were generally as it seemed none of the handsomest," wore not hats, but "only a parti-coloured blanket, which they call a plad, over their heads and shoulders." Brereton describes the plaid as "a garment of the same woollen stuffs whereof saddle-girths in England are made, which is cast over their heads, and covers their faces on both sides." Kirke praises the Scots for their singular skill in cookery, saying that "they may defy the world to rival them" in that particular. But one hardly knows whether to take him seriously or satirically when he adds that—"To put one's head into their kitchen doors is little less than destructive; you enter Hell alive, where the black furies are busied in mangling dead carcases and the fire and brimstone, or rather stew and stink, is ready to suffocate you, and yet (which is strange) these things are agreeable to the humours of the people. The poorer sort live on haddock, whiting, and sower milk, which is cryed up and down their streets (whea buyes sawer milk), and upon the stinking fragments that are left at their laird's table." Kirke also refers to the fondness of the Scots for tobacco; but, according to Morer, they prefer it in the form of snuff, which he describes each man as grinding for himself. He says—"They are fond of tobacco, but more from the snush-box than pipe. And they have made it so necessary, that I have heard some of 'em say, that should their bread come in competition with it, they would rather fast than their snush should be taken away. Yet mostly it consists of the coarsest tobacco, dried by the fire, and powdered in a little engine after the form of a top, which they carry in their pockets, and is both a mill to grind and a box to keep it in." It thus appears that a snuff-mull was not only a "snush-box," but was also a mill or grinding apparatus.

There are numerous references in the volume to the drinking customs of the Scottish people. Moryson says that they do not drink their wines with sugar as in England, yet at feasts they put comfits in the wine after the French fashion; "but they have not our vintner's fraud to mix their wines." Kirke says that on entering a house "you are presented with a great queigh of syrup of beer, after that a glass of white wine, then a rummer of claret, and sometimes after that a glass of sherry sack, and then begin the round with ale again, and ply you briskly; for it's their way of showing you'r welcome, by making you drunk. If you have longer time to stay, you stick close to claret till bacchus wins the field, and leaves the conquer'd victims grovelling on the place where they receive their overthrow."

The constitution of the Presbyterian Church and the order of public worship are minutely described by several writers, especially by Brereton and Ray. The latter describes a service in St. Giles (which is frequently referred to) when the Duke of Lauderdale was Lord High Commissioner. But even better than his description of the service is his description of the cathedral as "divided into six sermon-houses."

Many other interesting subjects are touched upon in this most entertaining volume, such as border raids, the use of coal, the exports and imports, gooseberries, oysters, farming, and forestry. Enough has been said to indicate the valuable nature of its contents, especially in the light they throw on the manners and customs of the Scottish people in early times. The introduction contains interesting notices of early travellers in Scotland, whose visits are not recorded. The book is admirably edited and annotated throughout, and deserves to be regarded as a standard authority.

Mahdiism and the Egyptian Sudan. By Major F. R. Wingate, D.S.O., R.A. Assistant Adjutant-General for Intelligence, Egyptian Army. With 30 Maps and Plans. London: Macmillan and Co., 1891. Pp. 617. *Price* 30*s. net.*

Major Wingate's volume may be regarded as a semi-official account of the rise and progress of Mahdiism and of subsequent events in the Sudan up to the present time. Owing to his official position, no less than his individual capacity to deal with the multifarious and complicated mass of evidence to which he has had access, his work takes the highest rank, and must inevitably be regarded as the standard authority on the subject. We are indebted to him for his painstaking labours, for his methodical and academic treatment, and for his luminous exposition of the darkest period in the history of the Eastern Sudan, so far as the relations of Europe with that unhappy country are concerned. Much of the success of his work is due to the fact that a large number of letters and proclamations of Mohammed Ahmed, the late Mahdi, and of his successor, the Khalifa Abdullah Taashi, were found in the manuscript letter-book captured at the battle of Toski, on 3rd August 1889. A mass of Arabic correspondence, relating principally to the events which occurred in 1883 and 1884, was also captured in Osman Digna's headquarters at the recent re-occupation of the Tokar district. Other sources of information are no less sure and reliable, and include the personal examination of the numerous fugitives who reached Lower Egypt, and the statements of officers and others who were closely connected with the most stirring events in the Sudan. Of equal interest and importance are the references to the Senussi and other religious sects, derived from important native functionaries and original correspondence. In consequence of this mass of reliable information—a large part of which is now made public for the first time—it is possible not only to see why it was that Egyptian rule and British intervention failed in their objects, but how to estimate the inimical, racial, and religious forces arraigned against them.

As might be expected, Major Wingate devotes a large portion of his space to the detailed accounts of the military movements in the Sudan, and to the reorganisation of the Egyptian army. His descriptions of the chief battles are made clearer by the excellent sketches of the battle-fields. Of special interest are the narratives of the fall of Khartum and the death of Gordon, and of the destruction of Hicks Pacha's army. Probably we shall never get at the exact truth, but in the meantime we may accept Major Wingate's evidence as practically conclusive in these respects.

A special and praiseworthy feature of this work is the admirable series of maps showing he gradual spread of the Mahdi's revolt year by year. In respect of maps and plans the book is most handsomely equipped.

The Caliphate: its Rise, Decline, and Fall. From Original Sources. By Sir William Muir, K.C.S.I. London: Religious Tract Society, 1891. Pp. 608. *Price* 10*s.* 6*d.*

In 1883 Sir William Muir published his *Annals of the Early Caliphate.* The first half of the present volume covers the same ground. The rest of it is divided pretty nearly between the Omeyyad and the Abbasside dynasties. A chapter is given to the nominal Caliphate under the Memluks of Egypt, from which the Sultan of Turkey derives his claim to the title of Caliph. And in the last chapter the history is briefly reviewed in the interests of Christianity.

When Mohammed died in 632 he had not formally designated any one to succeed him. His death came as a surprise. Bickerings and jealousies consequently arose. No principle could be drawn from the Coran to decide the question. Nor did the

election of Abu Bekr, the first Caliph, form a precedent. The question has therefore proved a perpetual source of strife and sedition. The differences have divided Moslems into separate parties, the chief of which are the Shiites and the Sunnites. Thus the question of the Caliphate must be studied historically by all who would take an intelligent interest in the Eastern Question and Moslem politics generally.

The question of the Caliphate is according to our notions a constitutional question. Sir William Muir, however, has not separated it from the general history. His work is more a history of the Caliphs, their lives and courts and political fortunes. The narrative of the story is a pleasure to read; in the description of battles especially it is pithy and terse.

But the Caliphs are not only Moslem sovereigns; they are Moslems. As here presented they are to serve avowedly as a contrast to gratify the bigotry of Christians. Evidently Sir William Muir could compile a *chronique scandaleuse* of the Caliphs and their courts for the use of Christian missionaries. Moslems might justly retort with an account of some Sovereigns and Popes of Christendom. Are the Caliphs representative Moslems? Sir William Muir has omitted all mention of Moslem saints, jurists, theologians, philosophers. One regrets above all that he has not done justice to the Motezilites in their endeavour to reform Islam into an ethical theism. One regrets it all the more that the progressive party of Islam at the present time both in India and Persia is working on Motezilite lines.

It is our duty in this place to animadvert on the absence of maps.

My Personal Experiences in Equatorial Africa. By Thomas Heazle Parke, D.C.L., Army Medical Staff. London: Sampson Low and Co., 1891. Pp. 525. *Price* 21*s.*

Dr. Parke attributes the belated appearance of his *Diary* to the pressure of professional duties. Of all the members of the Emin Relief Expedition he was, perhaps, the most popular with the public; so that it is probable his volume of experiences will be viewed with favour. The diary-form in which the book has been written is, of course, against its popularity—for it necessarily is full of trivial details; but, on the other hand, it is the only book of the Relief Expedition series, except Mr. Stanley's, in which an account of the entire journey is given. Moreover, only Dr. Parke has related the events at Fort Bodo, and the hard experiences of himself and Captain Nelson at Ipoto. The other specialities of his volume include a disquisition on Bacteriology, and minute—in some instances too minute—accounts of his medical and surgical cases. His remarks on African fevers and diseases, hygiene in Tropical Africa, and caravan-life, will be received with the attention they deserve, though they include nothing that is not already known by students of these subjects. Perhaps, however, we should mention as an exception his analysis of the arrow-poison of the Pygmies—the ingredients of which he was fortunate enough to secure.

Dr. Parke's volume is, on the whole, interesting. His style is unaffected and straightforward, and touches of humour occasionally brighten his pages. With the chief events that he records our readers must be more than familiar. The book is well produced, and it is furnished with a large map and some illustrations.

Studies in Jewish Statistics, Social, Vital, and Anthropometric. By Joseph Jacobs. London: D. Nutt, 1891.

This volume is a reprint of papers, contributed to the *Jewish Chronicle* and the *Journal of the Anthropological Institute*, by an expert who is himself a Jew. Scattered over the world the Jews, with all their intelligence and wealth, cannot

secure an accurate census of their numbers. They have been estimated by different authorities at all figures, from five to eight millions, having been three millions when they marched out of Egypt. Mr. Jacobs gives this table, taking seven millions as the total, and we accept it as the most reliable and detailed.[1]

Name.	Country.	Number.	Per cent. of whole.
A. *Jews both by religion and by birth.* . .	... ...	6,925,000	98·9
Ashkenazim, . . .	Teutonia and Slavonia, .	6,500,000	92·8
Sephardim, . . .	Romance, Levant, Africa,	425,000	6·1
Samaritans? . . .	Nablus, ...	150	...
B. *Jews by religion, but not by birth,* . . .	... ...	75,000	1·1
Falashas,[2] . . .	Abyssinia, . . .	50,000	...
Karaites, . . .	Crimea, . . .	6,000	...
Daggatouns, etc.,[3] .	Sahara, ...	10,000	...
Beni-Israel,[4] . . .	Bombay, . . .	6,500	...
Cochin,[5] . . .	Cochin, ...	1,600	...
C. *Jews by birth but not by religion,* . . .	... ...	12,000	0·2
Chuetas or Anussim,[6] .	Balearic Islands, . .	6,000	...
Maiminen,[7] . . .	Salonichi, . . .	4,000	...
G'did al Islam,[8] . .	Khorassan, . . .	2,000	...

His statistics show that the Jews marry less, have fewer births, die less (or live longer), increase at a greater rate, and have fewer still-born and illegitimate children than any other race. Goethe's generalisation expresses at once scientific fact and Bible truth regarding the Hebrew race :—"Es ist das beharrlichste Volk der Erde. Es ist, es war, es wird sein." The facts showing the wealth and poverty of the 45,000 Jews in London are new, and are full of interest at a time when Russia is expelling her own Jewish subjects.

Seas and Lands. By Sir Edwin Arnold, K.C.I.E., C.S.I. London : Longmans, Green and Co., 1891. Pp. 535. *Price* 31*s.*

Under the title "Seas and Lands" Sir Edwin Arnold has reprinted his letters of travel, which formed such an interesting feature in the columns of the *Daily Telegraph* during 1889-91. The bulk of the book is devoted to Japan, where Sir

[1] The best enumeration of Jews is by M. I. Loeb, art. "Juifs," in Saint-Martin's *Dictionnaire de Géographie*: his chief errors are making the number of Russian Jews too low by a million, and the Falashas 200,000 instead of 50,000.

[2] Rohlfs, in *Petermann's Mitteil.*, 1883, p. 213.

[3] Serous, *Les Daggatouns*, 1880. We include in this number the Mavambu, or Negro Jews of the Loango Coast (*vide* Andree, *Volkskunde d. Juden*, 1881, p. 90).

[4] Census of India, 1881, gives 7952 Jews in British Bombay.

[5] *Jud. Littblt.*, 1883, No. 36. The number of Jews in China is unknown.

[6] Descendants of Spanish Jews still isolated. Lewin, *ibid.*, No. 30.

[7] Descendants of followers of the Jewish "Mahdi," Sabbathai Zebi. Graetz in *Monatsft.* 1884, Feb.

[8] Jews forcibly converted to Islam thirty years ago, *Vesillo Israel*, April 1884.

Edwin lingered for fully a year. He thus had much ampler opportunity than is given to most tourists for studying this country of scenic beauty and its race, so unique in artistic feeling. As a series of word-pictures by a literary "impressionist" Sir Edwin's book will repay perusal. Even when he takes the pen of the historian, the charm of a good literary style makes thoroughly readable his treatment of "Extraterritoriality" and "Treaty Revision,"—dreary topics to all but the student of politics. There is also a description of the opening of the first Japanese Parliament, giving so far a certain historic value to the book; and the reputation of the author will secure many readers, whose interest could not carry them through the remarkable letters of the *Times*' correspondent bearing upon the same event. When we have called attention to the exquisite essay on Canadian native poetry given in the chapter entitled "Niagara," and have referred to the beauty of the illustrations, we have nearly exhausted our fountains of praise. For, to the student alike of geography and of ethnography the book is well-nigh valueless. There is indeed no pretence at geographical lore; but that is no reason for an author being inaccurate when he condescends to details. For example, on page 472 Sir Edwin adds one thousand feet to the height of Karuizawa above the plains, and locates Asama Yama near to a crag called "Cathedral Rock," which, however, lies a day's journey distant in quite a different drainage-area. Only a poet's eye, we think, could sight Satsuma (!) Light at the entrance to Yokohama Bay. He is guilty of a bad "slip" when he speaks of Fujisan as being "not much higher" than Mont Blanc, when it is very considerably lower, and in speaking of Hong Kong as the most *easterly* of Her Majesty's possessions. Early impressions might be forgiven; but what shall we say of a reputable author, who, after a year's acquaintance with the country, hopelessly confuses the permanent ocean-current *Kuroshiwo* (not *Kurosiwa*, see p. 509), with a periodic tidal current through the Straits of Shimonoseki? The ascent of Fujisan is, however, well described. As regards ethnography there is a good deal of good-humoured description of "unique, unparalleled, unspoiled, astonishing, fascinating, sweet-tempered Japan." But it is evident that Sir Edwin does not take the Japanese seriously. From the description (p. 163) of the Japanese lady in all her diminutiveness—whom, however, he compels to wear *waraji*, the foot gear of the coolie, pilgrim, country woman, and student-pedestrian—right on to the wordy analysis (p. 488) of the Emperor's stolid countenance, there is more of the journalist than of the earnest-minded ethnologist. Accuracy is not infrequently sacrificed to the turn of a phrase, as when the waiting-maid is described as *knocking* her pretty brow or her flat nose on the matting in the humility of her obeisance. Generally speaking, especially in regard to the women and girls of Japan, we think Sir Edwin has allowed his sentimentality to run away with him. We have known of Japanese women treated cruelly and harshly, in spite of his "nowhere and never" (p. 297). Under circumstances by no means uncommon, a Japanese wife has sometimes to suffer indignities of a very degrading character. We also wonder by what process of examination Sir Edwin drew the wonderful conclusion that the Japanese woman is "vastly superior" in mental type to the masculine portion of the population. The theory that the Japanese race results from a mingling of Mongolian and Malay types is simply stated as if it were an ascertained scientific fact—whereas there is absolutely no evidence, either linguistic or morphological, in favour of its truth. One characteristic of the book, which will not commend itself to the general reader, is the author's fondness for Japanese words when the English equivalents would serve quite as well. Occasionally, too, these are used wrongly. His reiteration of the word *musume* is particularly distasteful; it is as if an English writer, telling of a tour in Scotland, persisted in calling every girl a lass.

In spite of these and other blemishes (largely egotistic) that might be named, the book is eminently readable. The general view which Sir Edwin, in his less fanciful moods, takes of the Japanese character is, we think, sound. He distinctly controverts the common view that the Japanese are a specially fickle people. They have during the last generation entered upon a political and educational reform unprecedented in the history of nations ; but socially and individually they have not lost their peculiar characteristics. They have assimilated in a wonderful way certain features of our civilisation which they had failed to develop for themselves ; and in things artistic they have reacted upon the West in a manner still more striking.

The illustrations we have already referred to. In truthfulness they are indeed an education in themselves, but are largely independent of the text that accompanies them. There is, so far as our experience goes, only one better illustrated book on Japan, namely, *Papierschmetterlinge aus Japan* by Curt Netto. Sir Edwin's book will fill a vacant place on a drawing-room table ; but it is hardly entitled to be ranked on the library-shelf with the works of Rein, Griffis, and Miss Bird.

Denmark ; its Medical Organisation, Hygiene, and Demography. Published with subvention of the Danish Government. Presented to the Seventh International Congress of Hygiene and Demography, London, 1891. Copenhagen : Jul. G. Jellerup ; London : J. and A. Churchill, 1891. Pp. 467. Numerous Map-diagrams and Woodcuts.

There has rarely been a more interesting and concise description given of the medical organisation, hygiene and demography of any country than this work, which was so generously distributed to all the members of the Seventh International Congress held in London last year.

The volume has been compiled by an editorial committee of three—Drs. Lehmann, Carlsen, and Ulrik—assisted by sixty-four contributors and three translators. It is divided into three parts—medical organisation, hygiene, and demography. With regard to the medical organisation, a description is given of the civil, army, and navy medical organisation, followed by a description of forensic medicine, medical education, and the laws with regard to the rights and duties of the medical profession in relation to the public. Medical education in Denmark is very carefully supervised, and the practice of medicine is so very restricted that quackery, as it is known in this country, is almost an impossibility. The arrangements, too, with regard to pharmacy are stringent in the extreme. The chemist's shops are licensed by Government ; their distribution is limited to the needs of the population, and the chemists are compelled not only to provide good drugs but also to charge definite sums for the prescriptions they make up. Throughout the whole of Denmark there are only 160 chemist shops, or 1 to about 13,750 of the population. Very few doctors are permitted to dispense their own medicines, and, on the other hand, a chemist is not allowed to make up a prescription more than once unless he has had a distinct order from a doctor to do so. It would be well could such an arrangement be made in this country. With reference to the second portion of the volume, the general sanitary bye-laws are first given in abstract, and then a detailed account is provided with regard to the general sanitary measures employed with reference to water-supply, heating and ventilation, lighting in towns, sewerage, the disposal of the dead, and with regard to food inspection in general, and that of meat and milk in particular. We may call attention, perhaps, to the special advantages of the sanitary control of the cattle and the Copenhagen Milk Supply Company. Farmers

in Denmark may certainly be said to be the most carefully supervised persons in existence, for the cattle must be examined at least once a month by a veterinary surgeon, and the most stringent regulations are in vogue as to the destruction of milk from diseased animals; even the fodder with which the cattle are fed requires a veterinary surgeon's approval, and no fodder injurious to infant's milk must be used where there is a question of its supply.

The regulations for workmen's dwellings, both with regard to the size of the rooms and the sanitary arrangement, are very stringent, as, too, are the rules for schools and factories.

We need not refer to the regulations with regard to prisons or the poor law, which are, however, in every respect admirable.

The vital statistics of Denmark are carefully compiled, and much interesting information can be gained from a perusal of them. The number of inhabitants in Denmark proper in 1890 was 2,172,205, being 56·7 per square kilomètre. From 1840 to the present day, the increase of the population has been about 1 per cent. per annum. The average age at marriage is unusually high, only three-fifths of the men marrying under 30 years of age, and two-fifths of the women under 25. The marriage of widowers and widows is very common. The average number of children per marriage is about 3. There are 1294 blind persons in Denmark, and in 1886 there were 1255 deaf-mutes, or 63·7 per hundred thousand—a rate which is considerably under the average in Europe. Their distribution in the country varies considerably, being for the metropolis, the other large towns, and the rural districts, respectively, 45·0, 53·4, and 67·5 per hundred thousand. The death-rate is gradually decreasing.

Denmark takes a sad precedence over all other countries in Europe with regard to the relative frequency of suicide, the actual number for 1876-85 being 258 per million inhabitants. "The character of the Danish nation seems inclined to cause greater predisposition to suicide. Mention may thus be made of the Danes' gloomy views of life, which, combined with their critical sense, makes it difficult for them to become settled in their minds, especially as their confession places each individual in a more independent position with regard to the Church." But the writer of the division on suicide, Sörensen, says that too much weight must not be placed upon this, and refers to the contagious effect of the numerous examples; and he well remarks that the frequent description of suicide in newspapers is in consequence very unfortunate. In conclusion, we may remark that the translation has been very well done, and that the maps, diagrams, and woodcuts are satisfactory.

Géographie ancienne de la Basse-Egypte. Par le Vicomte Jacques de Rougé. Paris: J. Rothschild, 1891. Pp. 175.

The identification of the ancient Egyptian provinces enumerated in hieroglyphic inscriptions, with the Ptolemaic "nomes," was until quite recently a matter of theory and conjecture. Within the last few years, however, so much new material has come to light, and the progress of exploration has been so rapid and systematic, that the historical map of Lower Egypt seems to be on a fair way to reconstruction. M. de Rougé's book, at this stage of the work, is of the greatest value to students. He points out clearly what is known for certain, discusses doubtful points, and offers suggestions for the guidance of future workers. The excavations carried on by the Egypt Exploration Fund have been the principal means of fixing important sites such as Tanis, Naukratis, Pithom, etc., etc.; and M. de Rougé pays a generous tribute to the labours of this English Society, which has done s

much to elucidate the geographical problems of Lower Egypt. Still, the researches of French Egyptologists have in many cases paved the way for these very discoveries which have finally settled disputed points, and it is impossible to overrate the influence of a work like Brugsch's *Geographical Dictionary* as a guide and aid to explorers. Nor can the present comparative and critical *résumé* of Egyptian topography fail to be of the greatest service to those who are likely to lose their way in the labyrinth of successive corrections, due to the vitality and progress of scientific exploration.

Delagoa Bay: Its Natives and Natural History. By Rose Monteiro. London: George Philip and Son, 1891. Pp. 274.

This is a pleasing and vivid description of a lady's life at Delagoa Bay. The life and reminiscences it records are not that of an idler, but of an earnest student of nature. The author has more than a superficial knowledge of natural history, and is a zealous collector. Kafir life and customs come in for incidental remark, and are illustrated by appropriate anecdotes. But this is essentially a book for the naturalist, who will revel in her descriptions of the beautiful butterflies and moths, and the lovely flowers found in the neighbourhood of Delagoa Bay. The book is embellished with twenty original illustrations after the author's sketches and from natural objects.

The Ouse. By A. J. Foster, M.A., Vicar of Wootton, Bedfordshire. London: Society for Promoting Christian Knowledge, 1891. Pp. 223.

There are four rivers in England called "The Ouse"—one in Yorkshire, one in Sussex, the "Little Ouse" in Norfolk, and the "Great Ouse" described in this volume, of which the "Little Ouse" is a tributary. Mr. Foster conducts us in the most pleasant way from the source of the "Great Ouse," in Northampton, past Buckingham, Newport Pagnell, Tyringham and Gayhurst, Olney, Turvey, Bedford, St. Neots and Eynesbury, Huntingdon and Godmanchester, Earith and Ely, and, finally, to King's Lynn, where the river enters the sea. At each of these places our conductor stops, and describes the objects of interest in a manner showing much appreciation of scenery and considerable historical knowledge. The river under review might have been more clearly delineated by means of a special colour on the map accompanying this attractive little book.

Savoie. Par Paul Joanne. Paris: Hachette et Cie., 1891. Pp. 379.

The *Collection des Guides-Joanne*, to which this is the latest addition, is deservedly popular and prized in France. The author, M. Joanne, states that he spent two consecutive years in Savoy before publishing this Guide, and that he has been assisted by eminent local authorities. It is illustrated by five plans, five maps, and two bird's-eye views. Extremely useful hints to mountaineers are prefixed to the volume.

Handbook for Travellers in Northern Italy. Sixteenth edition. London: John Murray, 1891. *Price* 10*s*.

Handbook for Travellers in Switzerland. Part I.: Switzerland, without the Pennine Alps. Part II.: The Alps of Savoy and Piedmont, the Italian Lakes, and part of Dauphiné. Eighteenth edition. London: John Murray, 1891. *Price* 10*s*.

Murray's Handbooks are so well known that we need do no more than mention these new editions, which are, for the most part, all that can be desired. The Maps and Plans are excellent. We must take exception, however, to the map of Savoy

and Piedmont at the end of Part II. That part of the country referred to at page 486 of the guide-book, lying between Gressoney and Val Sesia, might be more fully indicated, and the road from Biella is made to end at Campiglia instead of at Piè di Cavallo at the head of the valley. In the *Handbook of Northern Italy*, at page 14, it should be stated that passengers' luggage for Italy may now be registered to Turin.

NEW MAPS.

EUROPE.

BRITISH ISLES, New reduced Ordnance Map of the ——. By JOHN BARTHOLOMEW, F.R.G.S. Scale 1 : 633,600, or ten miles to an inch.

London and Liverpool: George Philip & Son.

Since 1883 the Ordnance Survey Department at Southampton has published maps on the scales 1 : 63,360 (general maps), 1 : 10,560 (county maps), 1 : 2534 (parish maps), and 1 : 528 (town plans), but has not yet issued any maps on smaller scales. Mr. Bartholomew was the first to undertake to publish maps reduced from the new Ordnance Survey. His Reduced Ordnance Map of Scotland, on the scale 1 : 126,720, is still a special map, with only less detail than the 1-inch map; and now geographers have to thank him for the production of a general Geographical Map of the British Isles, on the scale 1 : 633,600, or ten miles to an inch. It has been reduced from the new Ordnance Survey, and, in addition, gives effect to the important changes that have since taken place. Although without hill-shading, it is otherwise complete in its topographical detail. Through the critical selection of names its character as a general map with regard to clearness has been well preserved. Insets of the environs of London, Liverpool, Edinburgh, Glasgow, Dublin, Belfast, Londonderry, and Cork, on larger scales, have been added, as also maps showing the Parliamentary Divisions of England, Scotland, Ireland, and London, and the Parliamentary Boroughs of England.

ESPAÑA Y PORTUGAL, Mapa Hipsometrico de ——. Por el Inspector gral. de Minas. Excmo. Sr. D. Federigo de Botella y de Hornos, de la Real Academia de Ciencias. Escala, 1 : 2,000,000. *Madrid*, 1888-90.

This is the first serious attempt that has been made to construct a genuine orographical map of Spain and Portugal. All the available data have been used, and are duly mentioned in an explanatory note on the map. The contours are traced at intervals of 100 mètres up to 1000, and at every 500 mètres above. The author does not pretend to give more than an approximate idea of the distribution of the mountain sand plains. The submarine contours near to the coasts are laid down in accordance with the soundings and surveys of the Spanish navy. Further out, foreign surveys have been consulted. The geology of the sea-bottom is also indicated. It is a pity that a work in which there is much to commend should be somewhat marred by unsatisfactory technical execution: owing to an injudicious selection of tints the mountain-features are not brought out with sufficient clearness, so as to give at a glance a general idea of the configuration of the land.

ETNA, Carta Volcanologica e Topografica dell'——. Costrutta dal Prof. Emilio Chaix. Scala 1 : 100,000. *Ginevra: H. Georg, Librajo Editore.*

Professor Emil Chaix has based this admirable work on his own Topographical map and on the works of W. Sartorius von Waltershausen, of Dr. A. von Lasaulx,

of Professors P. Chaix, H. de Saussure, and P. Silvestri; and he has made use of the survey of the Italian General Staff, as well as of the Geological Map of Italy. A notable excellence of the map is the representation of the topographical features of this great volcano, lightly chalked and printed in brown, underneath the geological colouring. The famous Val del Bove has been added as an inset-map on the enlarged scale 1 : 50,000.

LAGO LEMANO O DI GINEVRA, Carta Batimetrica del ——, secondo Scandagli Svizzeri et Francesi, contrutta e disegnata dall' Ing^e^ A. Delebecque. Scala, 1 : 150,000. *Cosmos, vol.* x. 1889-91. *Turino: Guido Cora.*

ROMA, Edizione Tascabile della Grande Pianta di ——.
Roma: Istituto Cartografico Italiano.

This is an entirely new pocket-plan of Rome, published by the well-known Istituto Cartografico Italiano. It will undoubtedly prove a very useful companion to travellers. In the next edition it would be advisable to adopt another colour, say, red—the central part of the city would thereby gain in clearness; also a slight exaggeration in the breadth of the streets would make the names more legible.

SICILIA, Carta Generale della ——. Disegnata da G. E Fritzsche. Scala. 1 : 500,000. *Roma: Istituto Cartografico Italiano.*

G. E. Fritzsche, of the Istituto Cartografico Italiano, has published an admirable general map of Sicily on the scale 1 : 500,000, which has been carefully reduced from the Italian survey. Contour-lines are drawn at suitable intervals. Shades of green are employed to represent the land up to 300 mètres, and brown for the greater elevations. Railways are shown as opened or under construction. Roads, boundaries of provinces, departments, and electorates are clearly indicated; and steamboat-routes are engraved in dotted lines. The islands of Pantelleria, Lampedusa, Linosa, Marittimo, Ustica, Stromboli, and Panaria are given as insets.

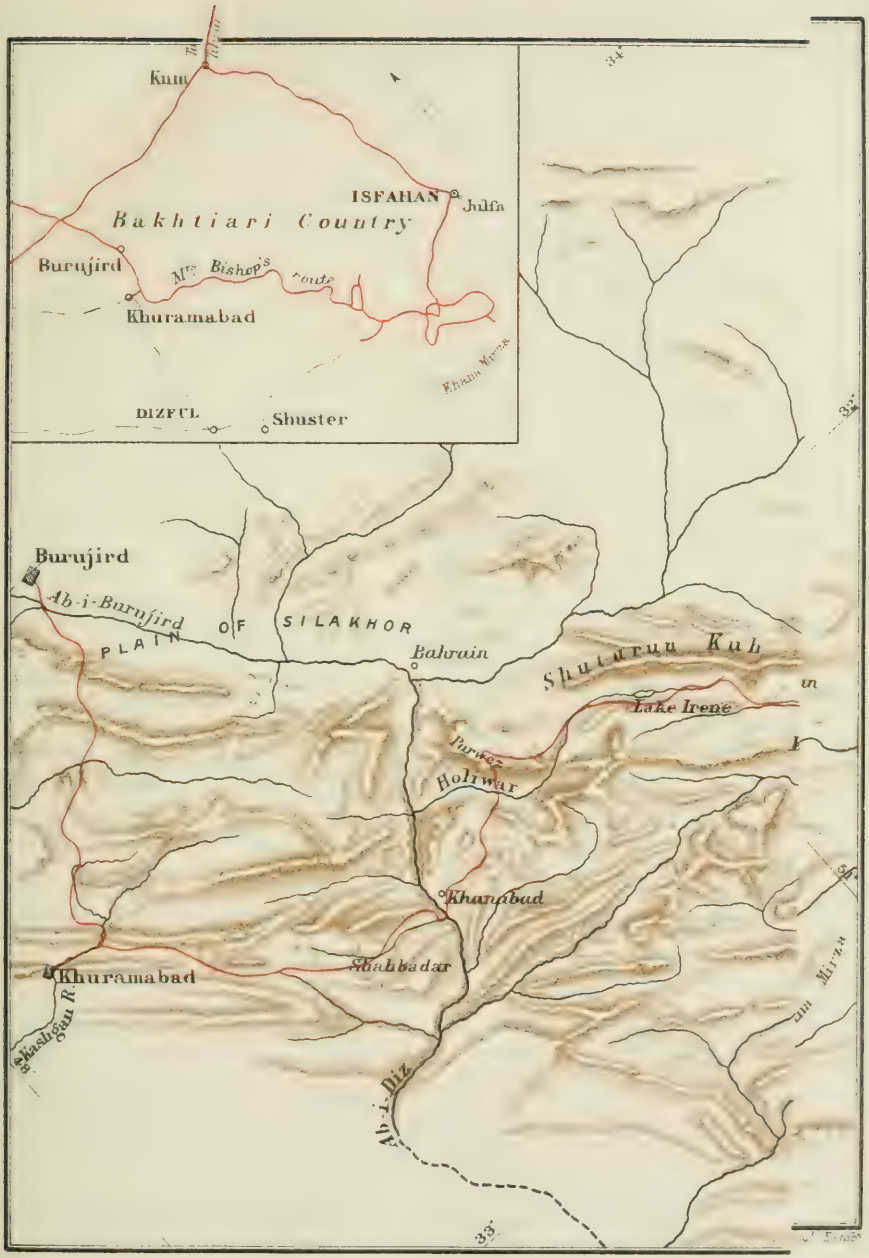
TROMSÖ AMT, Ethnografisk Kart over ——. Af Professor J. A. Friis. 6 sheets. 1890. *Christiania.*

FINMARKENS AMT, Ethnografisk Kart over ——. Af Professor J. A. Friis. 6 sheets. 1888. *Christiania.*

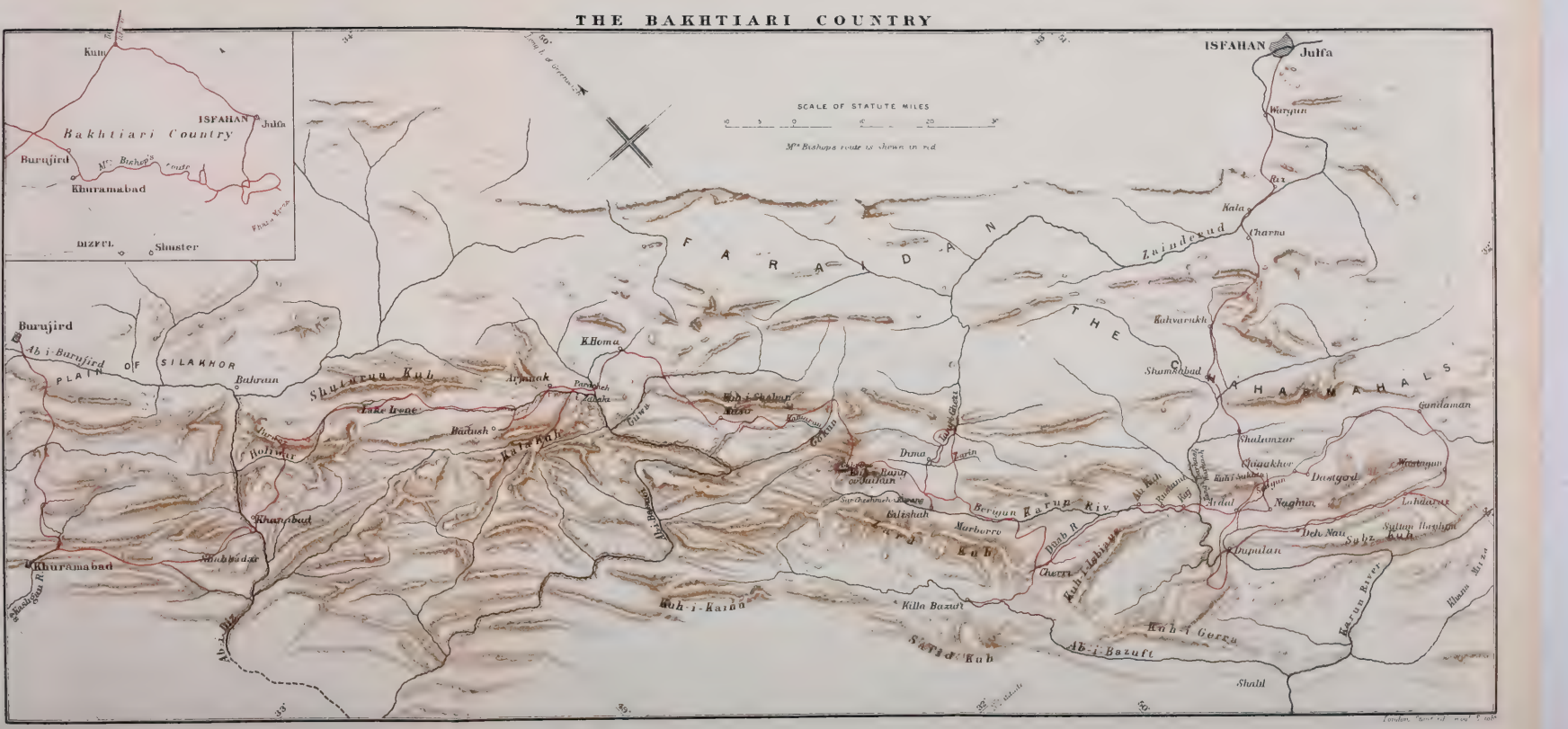
NEW ATLAS.

A SCHOOL ATLAS OF ENGLISH HISTORY. Edited by Samuel Rawson Gardiner, M.A., LL.D. A Companion Atlas to *The Student's History of England* by Samuel Rawson Gardiner. *Longmans*, 1891. *Price* 5*s.*

This valuable and convenient volume, containing 66 maps, and 21 plates illustrative of battles or campaigns, may well serve as a companion to other histories besides Mr. Gardiner's *Student's History of England*. Indeed, it contains in itself no little historical teaching. In contemplating, for instance, the numerous maps representing the condition at different dates of England and France, we are enabled at once to perceive the very different dates and circumstances under which each of these countries became unified—circumstances which had such a material effect in moulding the history of each. The map of the rest of Europe, as affecting British alliances at different periods, and that of India, are similarly treated, of course with less detail, but very effectively; and Africa and America, as containing other parts of the British Empire, are not forgotten.


Kum
ISFAHAN
Julfa
Bakhtiari Country
Burujird
Mrs. Bishop's route
Khuramabad
Khazia Mirza
DIZFUL
Shuster
Burujird
Ab-i-Burujird
PLAIN
OF SILAKHOR
Bahrain
Shuturun Kuh
Lake Irene
Parikan
Holiwar
Khuramabad
Shahbadar
Khuramabad
Kashgan R.
Ab-i-Diz
Mirza
34°
33°

THE BAKHTIARI COUNTRY



GENERAL MAP OF THE PAMI

PHYSICAL COLOURING.

Below 3000 ft.	3000 to 6000	6000 to 12.000	Above 12.000 ft

Scale 1 Inch - 70

100 80 60 40

D SURROUNDING COUNTRIES.

CHINESE TURKISTAN
Kashgar
Yangi Shahr
Yarkand
Kargalik
Faizabad
Tashkurgan
Sarikol Range
Pamir
Sarez Pamir
Rang-kul Pamir
Alichur Pamir
NEUTRAL TERRITORY
Hunza
Nagar
Chilas
Gilgit
Askole
Skardu
Iskardo (Skardo)
BALTISTAN
LITTLE TIBET
KASHMIR & JAMMU
SRINAGAR
KASHMIR
LADAKH
ZANSKAR
PUNCH
HAZARA
Abbottabad
PESHAWAR
RAWAL PINDI
Mastagh Ata
Kaufmann Pk
Karakul
Yangi Hissar
Yarkand
Kugiar
Kiliam
Posgam
Yakshamba
Tashkurgan
Kaindy
KASHGARIA
Plains of Pakhpu
Deosai
Leh
Zanskar
Padum
Kotli
Rajaori
Poonch
Mirpur
Jhelum
Chenab
Indus
Gilgit R.
Hunza R.
Yarkand R.
Tarim R.
Kashgar R.
Tagharma
Kilik P.
Mintaka P.
Khunjerab P.
Kara Art P.
Kara Tash
Kara Kul
Chak Kara Kul
Little Kara kul
Tupchin
Tash Bulak
Saigun
Kiryl
Ak Rabat
Aktala
Kok Rabat
Kinkol
Yakiraj Kurghan
Kara Pass
Kanjut
Khaibar
Shimshal
Shimshal P.
Aghil Dawan
Kilik
Mintaka
Tupchin
Kok Yar
Tangitar
Karawul
Kalta Atlak
Alan Artish
Oprak P.
Taru
Elam
Utukshat
Oksalu
Kosh bel P.
Tash Bulak
Yangi Hissar
Yapchan
Oordum Padshah
Kiryl
Ak Rabat
Aktala
Kok Rabat
Yakiraj Kurghan
Kinkol
Kara Pass
Posgam
Yakshamba
Kargalik
Tashkurgan
Kaindy
Chiraghsaldi P.
Yangi Dawan
Mazarkhoja
Tupa Dawan Pass
10,470
Kilian
Kugiar
Beshterek
Bordi
Sandaghshi
Chikilik
Tashkurgan P.
Karanghkar
Kuselong
Askole
Shigar
Kapalu
Khaplu
Skardu
Suru R.
Indus R.
Shyok R.
Shigar R.
Braldu R.
Dras
Kargil
Mulbekh
Khalatse
Lamayuru
Nimu
Leh
Khardung
Khardung P.
Saspul
Kanji R.
Zanskar R.
Suru R.
Dras R.
Shyok R.
Nubra R.
Shigar R.
Braldu R.
Indus R.
Kashmir
Srinagar
Jhelum R.
Chenab R.
Poonch
Mirpur
Rawal Pindi
Kotli
Rajaori
Punch
Zanskar
Padum

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

BRITANNIC CONFEDERATION.

VI.—THE CONSOLIDATION OF THE BRITISH EMPIRE.

By Lord Thring, K.C.B.

(*With a Map.*)

A UNITED British Empire, going forth—not conquering or to conquer, but to regulate commerce and spread peace and civilisation throughout its limits,—would be a dominion of a grandeur and beneficence as yet unknown among the kingdoms of the World.

The possibility of the establishment of such a reign of peace and goodwill has been widely canvassed. On the one side it has been said that the component parts of the Empire are so divergent in their interests that they will not admit of being welded into a compact mass. On the other side, it is replied that, granted that territories such as India and the spheres of influence in Africa cannot enter into complete union with Canada and Australia, there still remain a number of Colonies capable of being moulded into an efficient working Empire. In short, the solution of the problem of Britannic Confederation must depend largely on what is meant by *confederation*—what is the degree of union indicated, and what territories are intended to be tied together by a bond of greater or less stringency. The object of the present article is to deal with the whole question impartially. The facts, on which the conclusions in it are based, will in the main be found in the able papers already published in this Magazine. The task set before me is to collect and compare the results of those papers, and to present in a succinct form the existing conditions of the British Empire, and the means to be adopted to draw closer the bonds of union, or at all events to counteract the forces tending to greater disintegration.

The extent and general characteristics of the British Empire will be best understood by a careful examination of the excellent map, specially prepared to illustrate this series of papers, and appended to this number. It may be added, that the map has been designed by Mr. Silva White and compiled by Mr. J. G. Bartholomew. The Empire comprehends about one-fifth of the land-surface of the globe, and contains a population in the gross of 348,000,000. The countries of the British Empire occupied by settlers of European, and principally British, origin are distinguished on the map from those countries of the Empire in which the native element is in numerical preponderance. In the following pages the term Colonies is restricted to the former, whilst the latter are classed under the generic name of Dependencies. This classification has been adopted, inasmuch as the main object of this paper is to deal with certain typical Colonies rather than to discriminate accurately between the great variety of governments prevailing in the British Empire. The other original features of the map explain themselves. It may, however, be well to draw attention to the fact that an attempt has been made to show at a glance, by distinguishing the places where there are British Ambassadors or other accredited Diplomatic or Consular agents of the British Government, the vast organisation maintained by Great Britain for the protection and assistance of all the subjects of the Empire.

The United Kingdom, the centre and head of this vast aggregate of nations, has an area of 121,481 square miles, and a population of 38,000,000. The Indian Empire is far the most important of the dark-coloured Dependencies, and has an area of 1,533,611 square miles, containing a population of 286,000,000. The spheres of influence in Africa comprehend an area of about 2,462,000 square miles, with a large population, the amount of which is quite unknown.

The Colonies to be chiefly noted are the Dominion of Canada, Australia, New Zealand, and the Cape. The area and population of each of these Colonies is given below. The remainder of the Empire consists of numerous smaller Colonies; but, for the purpose of this paper, no detailed description is required of their extent or population.

	Area, Square Miles.	Population.
Canada, ...	3,456,383	4,830,897
Australia, ...	2,944,628	3,038,763
Cape Colony, . . .	221,311	1,527,224
New Zealand, . . .	104,235	668,353
Remainder (excluding India),	649,000	9,000,000
	7,375,557	19,065,237

The greater part of this vast Empire has been acquired during the course of 150 years by settlement, by conquest, and by that most dubious form of acquisition which passes under the name of annexation.

Having now stated the relations between Great Britain and her Colonies in respect to area and population, let us proceed to the consideration of their commercial relations. By the old school of political economists these would have been deemed the only ties worth considering:

we now know that sentiment and passion are as powerful, or more powerful, factors in the friendship of nations than even money and trade. Still, as the argument of the purse is a strong one, let us see how that stands between the mother-country and her children. In round numbers,

THE TRADE OF THE UNITED KINGDOM

With Canada . . .	is $2\frac{3}{4}$	per cent. of her whole trade.
Australia . .	$5\frac{3}{4}$	
Cape Colony . .	$1\frac{1}{8}$	
New Zealand . .	$1\frac{3}{4}$	
	— $11\frac{3}{4}$	per cent. or not quite $\frac{1}{8}$ of the whole
Remainder . .	$4\frac{3}{4}$	
India . . .	9	
Foreign Countries .	$74\frac{1}{2}$	

From this table it will be seen that, viewed solely from a pecuniary point of view, the trade of the United Kingdom with the Colonies, though of great importance, is far inferior in magnitude to her trade with foreign countries, being less than 12 per cent. of her whole trade.[1]

The next step in the progress of our investigations in respect to the relations of the mother-country to the Colonies is to ascertain under what laws the Colonies have grown up and what privileges they now enjoy. At common law a broad distinction is made between a conquered country and a country settled by British subjects. In the case of a conquered country, the existing law prevails till it is altered by the conqueror. The case of a Colony formed by English settlers is very different. An Englishman, according to Lord Mansfield, on settling in an uncivilised country, carries with him as much of the law of England as is adapted to his situation. Liberty is his birthright, of which he does not divest himself by going to other lands, provided those other lands are not within the jurisdiction of any recognised civilised power. All he requires to complete his status as a Colonist is that the tract of land on which he is settled should be declared by the Home Government to be adopted by them and placed under the protection of the British flag.

In the earlier Colonies the system most in vogue was to grant to any adventurous spirits desirous of settling—for example, in America—a charter, reserving to the Queen the power of appointing a Governor and creating two Houses of Legislature and committing to the Governor and the two Houses full power to make all laws necessary for the well-being of the new community. In more modern times the usual course has been to appoint during the infancy of a Colony a Governor with a Legislative Assembly, nominated by the Crown, to assist him in the Government; then, as the Colony advanced in years, to substitute two Legislative Houses: and, as a last stage, to give responsible government—that is to say, to make the advisers of the Governor responsible to the two Houses in the same manner as the Ministers of the Crown in the United Kingdom are responsible to the two Houses of Parliament.

[1] These statistics have been kindly supplied to me by Mr. J. FitzGerald of the Imperial Institute. They have been compiled from the latest returns.

In granting these institutions to the Colonies, the mother-country has shown no niggard hand, no selfish spirit. She has handed over to them vast tracts of territory—witness her most recent gift of one hundred million of acres to nine hundred thousand settlers in Western Australia. She has allowed, contrary to her most cherished policy, her Colonies to raise up against one another the barrier of Protection, and, stranger still, to impose protective duties against goods imported from the mother-country. No advantage, then, has been reserved to the mother-country. She cannot without the consent of the Colony settle her surplus population on lands defended by her navy. She cannot carry into a Colonial port the products of Lancashire or Yorkshire, the results of the industry of their British fellow-subjects, without paying a heavy duty.

What, then, is the position of the Colonist as compared with that of an Englishman, Scotsman, or Irishman—say, of a citizen of New South Wales as compared with that of a citizen of Manchester? How do they stand as regards the mother-country? Both are subjects of Her Majesty—as fully as if both had been born in England; they can alike be elected to Parliament, enter the army or navy, or be admitted to the bar, or to any other profession or calling for which British citizenship is a necessary qualification. Both, wherever they go, can claim the protection of the British Ambassador and the British Consul. Then as to their powers of government. First as to local affairs, the New South Wales man has the advantage over the Manchester man: the latter can by his representatives take part in the local government of England, but he has no reserve stock of land with which he can deal sufficient to give many cows and many acres to any of his neighbours who may require them. While in addition to his acres the New South Wales man has, to say the least, as large a power over the local government of his Colony as the Manchester man has over English local government. Then as to taxes—the Manchester man belongs to a community which contributes, according to Sir John Colomb, 19*s.* $5\frac{3}{4}d.$ out of every pound spent on the navy, and 20*s.* in the pound to the maintenance of the Foreign Office, or, in other words, to the maintenance of the relations of the Empire with foreign countries. In the benefit of this expenditure the New South Wales citizen has as large a share as the Manchester man, yet what does he contribute?—$6\frac{1}{4}d.$ of every pound spent on the navy, nothing to the army, nothing to the Foreign Office expenditure.

Such are the general conditions of the British Empire. It has cost hundreds of millions to build it up—an expense wholly borne by the mother-country. It costs over 14 millions a year to defend it at sea—the whole of which is defrayed by the British tax-payer, except to the extent of £381,000, of which India pays £254,000, chiefly for troopships and harbours, and Australia the remainder to maintain a local squadron. It has cost us a blood-tax which can only be estimated by the reflection that, according to some historians, our wars for the last two hundred years have really been sustained for the maintenance, expansion, and consolidation of our Colonial Empire—"*Gare à qui la touche.*"

What, then, are the inducements for the members of this great family to stand by and assist each other and the mother-country, and for

the mother-country to keep under her wing these great and growing communities? In considering this question India, is, of course, excluded: it has been won by the sword—it will, if the necessity arises, of which there appears to be little probability, be kept by the sword; and the considerations applicable to such a possession are totally distinct from those which bear on the question of the situation of our Colonies, properly so called. The spheres of influence in Africa and the mere Dependencies are also obviously excluded.

Some forty years ago a Colonial Society was formed in London for the purpose of determining the true relations between the mother-country and the Colonies. All the various political parties were represented amongst its members. These included Mr. Walpole, Mr. Adderley (now Lord Norton), Sir William Molesworth, Mr. Cobden, Mr. Godley, one of the founders of the Canterbury Settlement in New Zealand, Mr. Bright, and others. The object of the Society was to obtain self-government for the greater Colonies, then writhing and uneasy under the eccentric rule of the Colonial Office of the day. With this view, the opportunity was taken by Sir William Molesworth, on the occasion of a Bill being brought into Parliament in 1850 for the government of the Australian Colonies, to propose a scheme for conferring on them a complete system of self-government. This proposal, as might be expected, was not carried. The Government plan prevailed, and these Colonies did not obtain responsible government till three or four years later. The principles, however, on which the Society acted are at this distance of time of more importance than the mode in which it sought to carry these principles into effect. It was assumed that Colonies were outlets for the surplus population of Great Britain, that it was the duty of the mother-country to fill up the waste places of the World, and that she was bound to protect her Colonies so long as they were young and unable to protect themselves, but that national children, like the children of a well-ordered family, should be brought up with a desire to maintain themselves, and that they would, when adult, separate from their parent and set up for themselves. It was taught by the political economists of the time that Free Trade was about to make the World a universal brotherhood, and that the fact of a country being a Colony or not mattered nothing as respected the extent of its commercial intercourse with the mother-country, and that the burden of protecting it as a Colony far outweighed in a financial point of view any possible advantages to be derived by the mother-country from maintaining the connection.

Since 1850 far other counsels have prevailed. "The millennium" of Free-Trade has not been established; and, in the event of a war, grave inconveniences would arise to Great Britain, if Australia, for instance, were an independent State. In such an event Australia, however friendly, would be bound by the obligations of a neutral Power. As a belligerent, Great Britain could not fit or refit her ships at any Australian port. She could not obtain supplies, and would have to acknowledge the territorial waters of Australia as a place of refuge within which she could not attack any ship of the enemy.

Again, when the Colonist asserts his desire for independence, has he

ever considered that, though not wholly independent, he is in no sense dependent on the mother-country? The British Parliament has long since renounced the power of taxing the Colonies, and all that the mother-country asks of her children, even in case of war, is sympathy and voluntary support. Apart, then, from the higher considerations of feeling and patriotism which, as will be shown hereafter, condemn absolutely the education by the mother-country of her children with a view to separation, it may be admitted that, taking a lower ground, and looking to the protection of our commerce in time of war, every inhabitant of the United Kingdom should desire to retain the affections of his Colonial fellow-subjects by any reasonable concession. In discussing in those bygone years the advantages conferred by a Colony on the mother-country, it never occurred to the philanthropists of the Colonial Society that there existed a possibility of the Colony aiding the mother-country by troops or ships. The possibility of the presence of an Australian Contingent under the British commander in Egypt would have seemed to them a mere dream unworthy of the consideration of any one but a visionary sentimentalist.

If, however, we proceed to weigh in the balance the benefit to the colony as compared with that to the mother-country, which is secured by their mutual connection, it will be seen that the advantages in favour of the colony greatly preponderate. Take Australia as an example, and assume her to be independent. Where would she stand in the commonwealth of nations? Three millions of people would be charged with the protection of 8800 miles of seaboard. How long would Australia be for the Australians? What is there to prevent Germans, French, Italians from creating their "spheres of influence" in Australia? England protects them with an expenditure of 14 millions a year with a fleet that can follow an enemy into every sea, and blockade an enemy in its own ports. What possible force could Australia raise which could shut up the fleet of any European Power in port, or be prepared to meet such a force in the open sea? Again, in case of separation, at the very moment when money was imperatively required for defence, what would be the value of Australian securities? At the present moment the Australian Colonies raise money in the English market at the rate of three and a half per cent. Let them become independent, and great would be the downfall in Australian credit.

If we add to the cost of naval defence the expense of keeping up an army, and last—not least—the cost of a Foreign Office, with Ministers and Consuls and all the attendant paraphernalia of intercourse with Foreign States, it must be admitted that the Australian Republic would scarcely start on its course of independence in these days of annexation and filibustering without casting "a longing, lingering look" at the Old Country and its ever-present, ever-protecting flag. Then, as is well put by Sir John Colomb, and also by Mr. Hervey in his very interesting article, what influence would the Ministers and Consuls of an Australian Republic have? Instead of their Consul being the one to whom foreigners are often glad to apply for assistance, they would be liable in times of danger to find themselves in the position of those foreigners, and to have to appeal to the charity of the British Consul, whose protection they could no longer invoke as a right.

Having, I hope, proved that the views of 1850 were a mistake, and that no English politician of these days would desire to separate the sticks which are unbreakable while bound together, but which would snap so readily were they attacked singly, let us turn to the problem presented for solution—namely, the formation *within* the Empire of a Britannic Confederation. The phrase "*within* the Empire" is deliberately used; for it seems sometimes to be forgotten that, assuming the existence of such a Confederation, no inconsiderable portion of the Empire—notably India with its population of 286 millions, and the African spheres of influence —must inevitably be left out. Moreover, in considering the question in the only form in which it can arise in the immediate future, we may further narrow its scope by confining our argument to the larger Colonies—Canada, Australia, the Cape, and New Zealand; for any scheme applicable to them can readily be adapted to the smaller British Possessions when occasion arises.

What, then, is the nature of the proposed Britannic Confederation which is intended to draw closer the bonds of union between the mother-country and the Anglo-Saxon Colonies? What examples can be found in contemporary history of forms of government binding together political communities having local self-governing powers?—for to such forms of government the expressions "Federation" and "Confederation" are alone applicable.

An example which may be taken to illustrate all the characteristics of Federal Union will be found in the United States Republic. The thirteen American Colonies, which revolted against British rule, found themselves at the conclusion of the war in the position of thirteen independent States, having no connection with each other. The common tie of British supremacy had been dissolved; and each State possessed the prerogatives of making peace and war, of maintaining armies and navies, of regulating commerce and making treaties with foreign nations, which had previously been vested in the Sovereign of Great Britain. Such a state of things was intolerable. A cluster of thirteen small ndependent States lay at the mercy of any foreign Power; and, to obviate this danger, they agreed to form a Confederacy. This they attempted to do by the establishment of a central body called Congress, consisting of delegates from the component States, and invested with all the prerogatives of the British Crown. The expenses ncurred by the Confederacy were to be defrayed out of a common fund, to be supplied by requisitions made on the several States. The defects of this Confederacy soon became apparent. Congress was utterly devoid of all coercive authority to carry its laws into effect. "Every breach of the laws involved a state of war, and military execution became the only instrument of civil obedience."[1] "A still more striking defect was the total want of power to lay and levy taxes or to raise revenue to defray the ordinary expenses of government. Requisitions were to be made on thirteen independent States. The consequence was that, though in theory the resolutions of the Federal Government were constitutionally

[1] *Federalist*, p. 74.

binding on the members of the Union, yet in practice they were mere recommendations which the States regarded or disregarded at their option." Story sums up the whole question as follows:—"It has been justly observed that 'a government authorised to declare war, but relying on independent States for the means of prosecuting it, capable of contracting debts and of pledging the public faith for their payment, but depending on thirteen distinct sovereignties for the preservation of that faith, could only be rescued from ignominy and contempt by finding those sovereignties administered by men exempt from the passions incident to human nature'—that is, supposing a case in which all human government would become unnecessary and all difference of opinion would become impossible."[1] In this state of things the Americans perceived that it was quite possible to maintain complete unity as a nation if, in addition to investing the supreme government with the prerogative powers, they added full power to impose Federal taxes on the component States and established an executive furnished with ample means to carry all Federal powers into effect through the medium of Federal officers. A complete system of Federal taxation enforced by Federal courts supplied the central government with the necessary funds to perform effectually all the functions of a supreme national government.

To understand this system it is only necessary to reflect that every inhabitant of the United States has a double political status. He belongs to one great nation called the United States. He is also a citizen of a local self-governing body called a State.

The Empire of Germany is a Federal Union differing from the United States of America in having an Emperor at its head. The King of Prussia, under the title of German Emperor, represents the Empire in all its relations with foreign nations, and has the prerogative of making peace and war; but, if the war be more than a defensive war, he must have the assent of the Upper House.

In considering the position of the Empire and the prospects of Britannic Confederation, the first reflection that occurs is that a Britannic Confederation can extend only to the Colonies and not to the Imperial Dependencies—meaning by the Colonies, as has been already explained, the settlements of British, or at all events of British and other European, settlers, while the expression Imperial Dependencies is used to designate India, Ceylon, and the countries inhabited in the main by dark-skinned races. To draw an accurate line of demarcation between these two classes of Colonies and Imperial Dependencies is not possible or necessary. Again, to enumerate the Settlements included within the category of Colonies would conduce little to the solution of the problem before us, as it is with the typical representatives of each class, and not with details, that we have to deal. The only fact which it may be well to remember is that the Imperial Dependencies have a population of some 300 millions and a volume of trade of £196,000,000, while the Colonies have a population of some 20 millions and a trade of £162,000,000.

[1] Story, chap. ii. p. 96.

It is not, of course, intended by this comparison to put the Imperial Dependencies on a par with the Colonies in the estimation of Englishmen, but to show the vast numbers whose happiness is involved in the government of the Empire, and the great national interests affected by that government. Now, the common link between the United Kingdom, its Colonies, and its Imperial Dependencies—in other words, the force which makes the Empire—is the sovereignty of the United Kingdom: the prerogative of Her Majesty to make peace and war, to maintain fleets and armies, and to govern by that prerogative alone the Imperial Dependencies.

Let us now consider what privileges the Colonists desire of which they are not already possessed. They do not, of course, claim to interfere in the local government of the United Kingdom, inasmuch as the British Government does not interfere in their local affairs; and a Canadian or Victorian has, to say the least, as large a power of governing Canada or Victoria as a Yorkshireman has of governing England. Again, the Colonist has little to desire with respect to the regulation of commerce. A citizen of New York or Florida cannot, as such, impose any customs-duties or interfere with trade. A citizen of Canada or New South Wales can deal with the import and export of goods into his own Colony as he wills, even to the extent of imposing burdensome duties on the manufactures of the mother-country. It is true, a Colonist cannot make treaties with a foreign country; but to grant this privilege would enable Canada with four millions of inhabitants, or New South Wales with one million, to legislate for the Colonies and Dependencies alike—in other words, to make treaties binding on 303 millions of peoples. Such a concession is obviously out of the question. Again, with respect to the power of making peace or war. The Australians complained some little time ago that we were unwilling to allow the annexation of certain islands in the Pacific. Those islands were of no consequence viewed in relation to the Empire, and their annexation might have involved us in a European war. Would it be right that, for an indirect benefit to a particular Colony or Colonies, a war should be set on foot which would have disturbed the whole Empire and cost thousands of lives and millions of money? And how would a Colony in such a case be benefited by independence? Would all Australia, having a population of only three millions, if she made a demand on any of the great European Powers, have a chance of sustaining that demand? It is sometimes suggested that a Colony may be drawn into war by the mother-country, and would be safer if independent. Here, if ever, the *tu quoque* argument applies. As has been stated above, the Empire is a structure which has cost hundreds of millions of money and millions of lives to erect and maintain. "Where is the woman?" is the question of the wise man, in searching for the origin of any quarrel between individuals: "Where is the Colony?" would be an equally apposite question in respect of any difference arising between Great Britain and any civilised nation. Were Great Britain assisted in the protection of her Colonial possessions by a Colonial fleet, and of her Indian countries by a native fleet, would she not be a Power capable of defying the nations of the World?

Something may also be said of the vast influence she would possess if her children, following her example, would abolish their hostile tariffs, and adopt Free Trade throughout the Empire. Would not such an Empire be far preferable to any *Zollverein* formed on the impossible lines of a protective tariff imposed by the mother-country on all Colonial products to the detriment of herself and foreign countries? Is it to be expected that the British citizen who pays so much to maintain the army and navy under the shadow of which the commerce of the Colonies, including their protective tariffs, is carried on, would consent to be further taxed for the benefit of his richer brother in Canada or Australia?

Is it conceivable that Britain, having led the vanguard in Free Trade, should waver in her advance, give up her commercial treaties with foreign countries, and reverse her policy of the last thirty years? Surely it is more reasonable that the Colonies should substitute Free Trade for Protection, than to expect that the mother-country should return to a policy which she abandoned for the benefit of the working-man, for the advantage of the very class who, having emigrated, have, contrary to the opinion of the old Roman poet, changed their opinions with their change of climate. In short, it is easier for countries whose united commerce amounts to 160 millions to alter their commercial regulations, than for Great Britain to risk its 750 millions of trade by again subjecting it to trammels from which it has been so lately emancipated.

No argument is required to show that, as the British Empire exceeds in extent every other union of States which the World has ever seen, so it presents a complexity of interests which has no parallel in history.

Confederation and Imperial taxation must go hand in hand. If the Colonies desire representation in an Imperial Parliament they must be prepared to take their share in all Imperial burdens, including the National Debt. Further, taxes for Imperial purposes would have to be collected by Imperial officers and enforced by Imperial courts, as taxes for Federal purposes are levied in the United States by Federal officers. Such a scheme of union cannot be looked upon as feasible within the near future, but must be developed gradually, and progress with the advance of the Colonies in respect of population and wealth.

But admitting this to be a barrier to the formulation to-day or to-morrow of a detailed scheme of Confederation, may we not initiate a system calculated to lead up to such a union? The problem is a new one: new conditions require new political relations: and, without attempting to prophesy what the British Empire may become before the close of another half century, let us consider what may be done immediately in the way of Britannic Confederation.

Let, as Sir John Colomb suggests, an Imperial army and an Imperial navy, as contradistinguished from a British army and navy, be established by the mother-country, and a fixed status in that army and navy be offered on certain conditions to every Colony. Take first the army, and let me illustrate my meaning by supposing Canada to respond to the invitation of Great Britain. Canada would raise a body of troops and maintain them. They would not be *compelled* to serve in the Imperial army unless Canada were attacked by an enemy of Great Britain: in such an event

they would be as completely under the command of Her Majesty's officers as the British troops. In time of peace they would be regulated by the law of the Colony. If the Canadian troops were required for service out of their own country, it would be necessary to obtain their own consent. Form a navy on similar conditions. The ships would be commissioned by Her Majesty, but they would not be required to serve out of a certain restricted area except with their own consent. What has been said of Canada applies to every other Colony desirous of becoming a member of a Britannic Confederation. Let the Colonies contribute in proportion to their size and wealth to the Imperial army and navy, and there can be little doubt that their influence in making peace and war will be in proportion to the strength of their battalions and the number of their ships. Nor need the intervention of the Colonies in British politics be only indirect. The direct intervention of a Colony may be secured by elevating the position of an Agent-General to one more akin to that of a Minister of a foreign State, and giving him a facility of access to the British Government and a social position commensurate with the important duties with which he would be intrusted.

Social links, as they may be called, between the mother-country and the Colonies might also be multiplied by adopting, as Sir John Colomb proposes, freer postage, telegraphic and other communications. There seems also no reason why a scheme should not be adopted whereby an interchange should take place between the Civil Service of a Colony and the English Civil Service. The Colonial Office might thus obtain a practical knowledge of genuine Colonial wants and ideas, and the staff of the greater Colonies might be strengthened by the assistance of men versed in the business of the higher departments in the English Civil Service. No stronger argument for the introduction of such a plan can be found than in the career of Sir Robert Herbert, who has just retired from the Colonial Office, to the regret alike of the Colonies and the mother-country. The personal knowledge and experience of Colonial affairs which he gained during his tenure of office as Premier of Queensland from 1860 to 1865 have, by universal consent, given him a unique position as adviser to the Secretary of State for the Colonies.

A material step in advance has already been taken in the blending of English and Colonial ideas by the establishment of the Imperial Institute, whereby Colonists, on their arrival in this country, will find an institution in which they can conveniently meet for business or pleasure and obtain information. Last, but not least, the Imperial Federation League, through its able lecturer Mr. Parkin, has diffused throughout the United Kingdom and the Colonies a greater knowledge of the advantages to be derived from closer acquaintance and mutual confidence.

What, then, is the outcome of the whole question? The Colonies have all the powers of government, which communities can possess, except the Sovereign's prerogative of making peace and war and regulating commerce with foreign nations. These powers are, both in monarchical and republican States, vested in the head of the supreme government, and are practically controlled in constitutional States by the necessity of appealing to the people for money to carry on a war or for laws to

enforce treaties. If the Colonists are desirous of making their influence felt on these questions, the means are in their own hands. Let them ask the mother-country to form an Imperial army and navy, and let them contribute their quota to the land forces and reinforce the navy with their ships. As they grow in strength they will grow in influence, and when the five millions of Canadians have become a hundred millions, when the Australians can reckon fifty instead of three million inhabitants, and their local naval and military forces have grown in equal proportion, it may be that their numbers may be so great as to virtually shift the supremacy from the old country to the new; but that time has not yet arrived. The immediate Britannic Confederation should consist of a political organisation in which the Queen should maintain the existing prerogatives, but in which the Colonies, who are able and willing to give substantial assistance in the defence of the Empire, should be represented in London by Ministers, as suggested above.

Let me not be misunderstood. We may attempt "to dip into the future as far as human eye can see," and imagine an ideal State with its millions of British subjects commanding such an ascendancy in the World as to be able to insist that—

> "The war-drum throb no longer and the battle-flag be furled
> In the Parliament of man, the Federation of the World";

but the hour is not yet, and for the present we must rest the stability of the Empire on the mutual affection of the mother-country and her vast Colonial family. What is there wanting in such a tie? There is a common origin, a common flag, a community of glorious recollections. The Canadian, the Australian, the New Zealander, each has his share in Agincourt, in Blenheim, in Waterloo, in the Crimea; his fathers were Englishmen—he, too, is an Englishman. "*Civis Romanus sum.*" "I am a British subject," he may proclaim everywhere, and he will find his claim allowed and respected. It may be said that such ties are merely sentimental, silken ties, broken by the slightest strain. If this be so, then love of country is a mere sentiment, nationality is a mere sentiment—the purest, liveliest, strongest affections of the human heart are mere sentiments. History tells us in every page that a common nationality is the firmest bond which unites men in political communities. Look abroad at Poland, still restless and uneasy because her nationality has been crushed and trampled upon. Consider the Slav aspiration for unity, seething and disturbing Europe with its misplaced energy and ambitious cravings. Ask the Hungarian why he revolted from Austria and is content because his nationality is recognised. Search the World throughout its length and breadth, and it will be found that combinations of States are strong and compact in proportion as their component members possess a common nationality and are bound together by a community of sentiment. Great Britain and her Colonies are the greatest combination of States of a similar origin which the World has yet known. They are held together by the firmest tie—that of "kindred blood, similar privileges, and equal protection."

THE GRAN CHACO.

By J. Graham Kerr.

(Read at Meetings of the Society, Edinburgh, Glasgow, and Dundee, January 1892.)

The Gran Chaco is a region lying in the interior of the southern portion of South America. The origin of the name is uncertain, but the derivation most usually accepted is that given by Padre Lozano, one of the early historians of Paraguay. He points out that in the Quichua tongue the word *Chaco* means a drive of wild animals, and makes out that this name came to be applied to the Chaco from the wholesale flight of the Peruvians into its fastnesses, on the invasion of their country by Pizarro and his Spaniards. In the older writings we find the name given as "El Gran Chaco Gualamba," but in the present day only the shorter form is used. The extent of the Gran Chaco is, we may say, in the one direction between 20° and 30° S. latitude; and in the other between the Andes and Rio Salado, and the Paraguay-Paraná—in all an area of something like 180,000 square miles.

Physiographically, this region is divided into three sections by the rivers Bermejo and Pilcomayo, which cross it diagonally from the Andes to the Paraguay; and the three sections so formed are named Chaco Austral, Chaco Central, and Chaco Boreal, respectively. Politically, the division of the Chaco is again into three parts: between the republics of Argentina, Paraguay, and Bolivia. Argentina holds the Chaco Austral and the Chaco Central, which form two of her federal territories and are known officially as the "Territory of the Chaco" and the "Territory of Formosa." The Chaco Boreal is divided between Paraguay, which claims the wedge-shaped portion between the Pilcomayo and parallel 22, and Bolivia, which claims all north of this line.

The Chaco is the more northern portion of that great estuarine plain whose southern part is so well known to us as the Pampas, and which forms a large portion of the basin of the Rio de la Plata. In its physical features the Chaco agrees in many points with the Pampas; the sharp line of demarcation between them is due rather to their botanical characteristics. The Pampa is open, grassy, and treeless: the Gran Chaco, on the other hand, possesses luxuriant forests. Its surface is almost uniformly level, broken only by almost imperceptible undulations, and with a general slope of from 8 to 10 inches per mile towards the SE. The mean height above sea-level of the Chaco Central may be taken as about 450 feet.

Upon its western border, many streams pass into the Chaco from the valleys of the Andes. These wind hither and thither on the almost level plain, traversing extremely tortuous courses, and thus exposing an immense surface to evaporation. The effect of this, coupled with the extreme dryness of the climate, is to cause the volume of these streams greatly to diminish during their plain track, and it is only the very largest and

most rapid-flowing which during dry seasons manage to convey any of their waters into the Paraguay. In point of fact, besides the Salado which bounds its southern margin, we may say there are only two rivers which permanently carry water right across the Chaco. They are the two already mentioned—the Bermejo and the Pilcomayo. These pursue a roughly parallel course to the south-eastward across the Chaco plain, until at length, their further progress being barred by the edge of the Paraguayan and Entrerian uplands, they are compelled to turn sharply to the south, along with the waters of the Paraguay and Paraná.

These two rivers, the Bermejo and the Pilcomayo, have been the object of so much interest, and of so many attempts at exploration, that I may say a few words upon each of them. The cause of their having attracted so much interest may readily be apprehended by a glance at the map, for they are seen to connect the Bolivian mountain regions, with their enormous wealth of minerals, with the river Paraguay, and so with the outer world. Pursuing our chain of reasoning, still based on an inspection of the map, we might conclude that the Bermejo and the Pilcomayo, more especially the latter, are waterways destined by Nature to tap the whole trade and wealth of Bolivia, and conduct it into the market of Buenos Aires. Let us now quit the map, and look at the rivers as they are, and we shall see whether such conclusions are sound.

The more southern of the two rivers, the Bermejo, has been navigated on several occasions through the greater part of its plain track, the earliest successful attempt being that of Lieutenant Thomas Page, the well-known explorer of the Paraná and Paraguay. The successful navigation of the river led eventually to the formation of a Bermejo steamship company, of the success of which, however, it is unnecessary to say more than that the remains of its various vessels may still be observed at various points in the bed of the river. The Bermejo is in fact a wild and ungovernable torrent, on which navigation, although it may be possible in the hands of a daring and skilful explorer, will assuredly never be of economic importance.

The Rio Bermejo, or Red River, is formed by the junction of numerous small streams that drain the eastern parts of the Andes between 21° and 24° 30′ south latitude. Debouching into the plains of the Chaco, it pursues a tortuous course of about 1000 miles to the river Paraguay, a distance which, in a straight line, measures only about 450 miles. For considerably more than half this distance the river consists of two branches—the more northern of which, of recent formation (1871-72), now carries about four-fifths of the water, and is known as the "Teuco," from the Indian word "Teuch," meaning river. Besides carrying a much greater volume of water than the old channel of the Bermejo, the Teuco is much less tortuous, and it has therefore been usually selected by vessels ascending the river. The Rio Bermejo traverses a section of the Chaco where the slope is relatively great, and its current is extremely rapid, normally being from four to five miles an hour, and in flood-time far exceeding this rate. The most striking character of the Bermejo waters is their deep yellowish red colour, due to the immense amount of solid matter held in suspension, from which the river derives its name of

"Bermejo" or "Red." In flood-time, in fact, its waters are practically liquid mud, and it has been calculated that the Bermejo annually discharges into the Paraguay 50 million cubic feet of solid matter. The water, when filtered, is quite drinkable, and has a pleasant sweetish taste. The Bermejo has, as I before mentioned, been several times, and will, I have no doubt, be again many times navigated successfully; but I distinctly hold that it will never become a highway of commerce. The great length and tortuosity of its course, the rapidity of its current, the innumerable snags, and the ever-changing sandbanks with which its channel is sown, constitute, to my mind, practically insuperable difficulties. The lands bordering the Bermejo are, with the exception of a few agricultural and wood-cutting settlements, and the chain of forts along its right bank, entirely in the hands of the wild Indians.

The Pilcomayo traverses the Gran Chaco roughly parallel to, and about 180 miles to the north of, the Bermejo. It has hitherto been described as in every way analogous to the Pilcomayo, a statement which, from my own observations, I must venture to contradict. Setting aside the fact that they both rise in the Andes, that they cross the Chaco in a southerly-easterly direction, and that they empty their waters into the Paraguay, it would indeed be difficult to find any points of resemblance between the two rivers. The waters of the Pilcomayo are collected amongst the southern parts of the Bolivian Andes, and just before leaving the high ground they are largely augmented by an important tributary, the Pilaya. The now considerable volume of water enters the plain, and at once begins to wind about in the most erratic manner, and eventually, vastly diminished in volume, reaches the region of the Paraguay, shortly before entering into which the river receives, on its left bank, a small fresh-water affluent, called the Rio Negro. The confluence with the Paraguay is just opposite the prominent hill of Lambaré.

In geological structure the Gran Chaco resembles its southern continuation. Solid rock is but rarely seen, and when it is exposed in the river-bed, we find it to consist entirely of the soft, fine-grained Tertiary sandstones of the Pampean Age. River sections show a horizontal series of these beds topped by fine flood silt, with occasional layers of sand. The soil is, in the inner part of the Chaco, almost entirely composed of this extremely fine-grained silt, true vegetable mould being almost entirely absent, and it is evidently a product of the periodic inundations which the region undergoes. It is so exceedingly fine-grained as to be almost impermeable to water, except under the action of capillarity.

Rain-water scarcely sinks through it at all; but, during the periods of intense desiccation, capillarity causes a continuous though imperceptible upward progress of moisture to the surface, where it is evaporated, deposits the salts held in solution, and is replaced by a fresh supply from below. In this way the amount of soluble mineral matter in the upper layers of the soil goes on increasing continually, and such is, I believe, the explanation of the saltness of the Chaco soil; and, as if bearing out this view, we find that within the forests, where evaporation is so much less potent, the soil is no longer abnormally salt.

An interesting phenomenon frequently to be seen in this region is, that the surface layer of flood deposit in the dry season exhibits the most perfect division into vertical pentagonal columns. This, again, I attribute to the extremely fine-grained character of the deposit, there being no pebbles or other obstacles to the due working of the physical laws of contraction, which consequently produce the same result as during the gradual cooling and contraction of a stream of basaltic lava.

The climate of the Gran Chaco is essentially one of great extremes. In the forest-band around its margin these extremes are tempered off to a certain extent; it is in the open central portions that they are most felt. The average rainfall at Formosa in the Central Chaco is 54 inches annually. In the more central parts of the Chaco, however, it is probably much less than this, owing to the long-continued seasons of drought. There can scarcely be said to be a true rainy season, for though, as a rule, most of the rainfall is restricted to the summer months—October to March—yet occasionally heavy rains occur at other times of the year. The rainfall over the Gran Chaco, generally, appears to be subject to a curious cycle, the length of which is approximately ten years, the periods of maxima being marked by universal inundation to a depth of several feet over enormous tracts of country. During these inundations the Chaco rivers may rise to a height of 20 feet above the normal, and continue in high flood in any case for several months, sometimes for over a year. Succeeding this period of rainfall, a period of desiccation sets in. The overflow waters contract their limits and become isolated lagoons: these in turn shrink up, and give place to marshes, and the intervening country becomes dry, and parched, and saturated with salt.

The mean temperature of the Central Chaco we may take at about 72° F., on either side of which, however, great variation takes place, so that on a summer's afternoon, with a north wind blowing, the temperature in the shade may frequently go up to 110° F., while in the depth of winter, just at sunrise, it may fall below freezing. The great fall of temperature always experienced in the early hours of the morning is the result of intense radiation taking place from the grass-covered plains towards the clear sky, and, as a natural consequence of this great fall in temperature, the nightly dews in the Chaco are extraordinarily heavy. The prevalent winds are the north and the south. The former is the hot wind; it is comparable with the Sirocco. It parches up all nature, and in animals powerfully affects the nervous system, in some cases even producing insanity. The south wind, which fortunately blows for a greater part of the year than the north, is, on the other hand, cold and refreshing; and it is to its meeting the north wind, and cooling it rapidly, that the rains of the Chaco are due.

The surface of the Chaco generally is covered with vegetation characterised by its extreme sameness and monotony. This is all the more striking when one compares it with the rich tropical luxuriance of regions in the same latitude to the eastward. One finds, as, in fact, in most extensive open plains, an absence of variety and a marked preponderance of what are called social plants.

In the typical interior parts of the Chaco far-reaching grassy expanses

are varied by patches of forest, or *monte*, composed for the most part of small and scrubby myrtaceous trees.

The open grass-lands are frequently dotted with innumerable *Carandai* fan palms (*Copernicia cerifera*, Mart.), and then we have one of the most characteristic types of Chaco scenery—that of the *palmar* or palm grove. The ground is everywhere covered with a thick growth of grass, of four or five feet high, from which arise at intervals the thick and squat stems of the *Carandai* palms. These *palmares* are quite unique in their general effect. In the early morning, when the air is crisp and clear, and not a breath of wind stirs, and the tips of the palm leaves are bathed in golden sunlight, the scene is one of fairy-like beauty. But in the depth of winter, when the grass has all been consumed by Indian fires, when the sky is covered with leaden clouds, and a biting south-east wind causes the dry and withered palm leaves to rustle mournfully, then the scene is one of bleak and inhospitable melancholy.

The Palm Forest covers immense areas throughout the Chaco, and is specially characteristic of the low-lying portions liable to inundation; and one may always see on the palm trunks a dark line some three to five feet above the ground, marking the level of flood waters.

The patches of forest in the interior of the Chaco are not at all of the kind apt to be recalled by the words "South American Forest," but are little more than thickets of small and scrubby trees, so interwoven with lianas and other climbing plants, and mingled with spiny *Bromeliaceæ* and cacti, as to be quite impassable by man or beast.

One does find an occasional large forest tree, but these are comparatively few in number. In the little *montes* one finds the *Guayacan* (*Cæsalpinia melanocarpa*, Gr.), the *Quebracho colorado* (*Quebrachia Lorentzii*, Gr.), and the *Palo cruz* (*Tabebuia nodosa*, Gr.), all fine timber trees: while, in the open, one encounters several species of the genus *Prosopis* — the *Vinal* (*Prosopis ruscifolia*, Gr.), the *Algarobo* (*P. dulcis*), and the *Ñandubey* (*P. nandubey*, Lor.). Of these, the *Algarobo* bears a long locust-like pod containing a large quantity of sugar, and which forms an exceedingly nourishing and staying article of food. The Indians pound the pods up, and mix them into a kind of paste with the fruit of the *Mistól* (*Zizyphus mistól*, Gr.), so as to form a very palatable kind of cake.

Other important trees occurring in the central parts of the Chaco are the *Palo santo* or Holywood (*Guayacum officinale*), so well known both as a timber and as a drug, and the *Cascarandá*, of which the heartwood forms a timber of extraordinary density, hardness, and tenacity.

I shall not detain you by mentioning any of the smaller plants of the Chaco, with the exception of two. The first of these, the *Uvirá* of the Paraguayans, is a Bromeliaceous plant with long narrow leaves, which, with a minimum of trouble, yield a fibre of great tenacity, especially valuable for its power of resisting the effects of moisture. At present its fibres are greatly used by the Indians, who make from it a coarse cloth for their garments, as well as twine and rope: but it yet remains to be exploited by European capitalists, when it will no doubt give rise to an important industry. The other plant is the *Caraguatá ü*, another *Bromelia*, which, although of little value in itself, becomes an inestimable

boon to the explorers of the salt-saturated region it inhabits, for the hollow axils of its leaves store up the dew and other moisture, and preserve it cold and clear as if for the special benefit of the traveller.

I have said that the vegetation of the Chaco is poor and monotonous on the whole, but I must qualify this statement by mentioning that on the borders, where the climate is more equable and the country better drained, we find a band of luxuriant vegetation. Towards the western border this takes the form of a continuous strip of absolutely impenetrable forest; on the eastern, of rich woodland, interspersed with luxuriant pasture. It is this peripheral zone, and narrow prolongations of it along the banks of the fresh-water streams, that I believe to be the only parts of the Chaco destined to become of great economic value.

Animal life in the Chaco is varied and characteristic. The marshy regions are the haunt of the Tapir (*Tapirus Americanus*), the Great Marsh Deer (*Cariacus paludosus*), the *Carpincho* or *Capibará* (*Hydrochœrus cabybará*), the *Coypu* (*Myopotamus coypus*), and a large otter (*Lutra paranensis*). By the forest margin one encounters large troops of Peccaries (*Dicotyles labiatus* and *D. torquatus*), an occasional Great Ant-eater (*Myrmecophaga jubata*), and numerous Armadilloes; while here and there one comes across one of the large carnivora, such as the Jaguar (*Felis onça*), the Puma (*F. concolor*), or the *Aguará guazú* or Maned Wolf (*Canis jubatus*). Bird life is abundant and varied, flocks of shrill-voiced parrots fly hither and thither, woodpeckers of all sizes and varieties are heard busily at work, and by the margin of a lonely lagoon one may see the great Jabiru (*Mycteria americana*), standing motionless on one leg, as if buried in contemplation of the silence around him.

It is perhaps at night that the explorer becomes most impressed with the presence of animal life in the Chaco. If it is summer-time, the whole air is filled with the sounds of insect life—high above everything else rises the metallic hum of the mosquito, and the chirp of innumerable crickets; while this is broken in upon every now and then by the heavy hum of a large beetle, or the shrill railway-whistle of the Cicada. In winter-time, however, the nights are excessively cold; the insect world is still; and there reigns over all Nature a silence deep almost to oppressiveness, broken only at intervals by the cry of the *Ñacurutú Owl* (*Bubo virginianus*), or the loud roar of the *Aguará guazú*, or the fearful and blood-curdling screams of the *Paca-á* (*Aramides ypecaha*). The intense wildness and eeriness of these night-sounds of the Chaco must be heard to be appreciated; but the wildest and most eerie of them all is the voice of its human inhabitants, when heard chanting at dead of night a war-song, or a wild lament for their dead, or a night-long incantation to drive away the evil spirits from their sick ones.

The human inhabitants of the Chaco are, considering its immense area, few and far between. The entire Indian population has been very variously estimated, and at the present time it is rapidly diminishing, owing partly to the merciless persecution which the aborigines undergo in the parts of the Chaco adjacent to the Argentine frontiers, partly to the ravages amongst them of imported diseases, and, according to many authorities, to the systematic practice of infanticide. This latter cause I

believe, however, to be non-existent. The Indians are divided into a very large number of distinct nations, distinguished by well-marked differences of language and of customs. Azara, whose statements on this point have been much called in question by D'Orbigny and other later writers, reckons them—and I believe perfectly correctly—at some seventeen, named as follows :—Chiriguanos, Aquitequedichagás, Ninaquiguilás, Guanas, Mbayas, Payaguás, Guaycurús, Lenguas, Machicuís. Nimkás, Guentusés, Tobas, Pihlagás, Aguilots, Mocovís, Abiponés, and Vilelas. The most important of these at the present time are the Chiriguanos, a branch of the Guaranis, a peaceful agricultural race who inhabit the north-west frontiers of the Chaco, and the warlike Mocovís and Tobas, the latter of whom hold possession of the lower parts of the Pilcomayo and Bermejo and the region lying between, and the former a large stretch of country to the south of the Bermejo. It is these last, the Tobas and the Mocovís, who suffer most from the frontier warfare. They are brave and patriotic, and they are therefore shot down on every opportunity.

In manner of life the various nations differ much from one another. Some, such as the Chiriguanos, follow agriculture, form fixed settlements, and are quiet and docile in disposition. Others, such as the Nimká, adopt a mixture of agriculture and hunting; while others again, more especially the Tobas, live entirely by the chase, and are, as a natural consequence, absolutely nomadic in their habits. It was with the Tobas of the Pilcomayo, who had never before seen a white man, that I had most experience, and I shall therefore say a few more words regarding them.

The Tobas of the Pilcomayo inhabit both banks of that river from about 24° 40′ south latitude, and also the country to the south-west over a considerable area. Their neighbours are : to the eastward, the Machicuí; to the north, the Nimká; to the north-west, the small nation of Pihlagá; and to the west and south-west, tribes of their own nation. With the Nimká a constant and inveterate warfare is carried on, in which the Tobas are allied with the Pihlagá; and with the Machicuí and the other Toba tribes matters are very similar, although the warfare is less constant. Indian warfare in the Chaco is for the most part a desultory guerilla, and it is only rarely that large bodies of men meet in open battle.

The Tobas are divided up into a large number of small tribes, varying in size from ten up to a couple of hundred able-bodied men. Each tribe is under a chief, who, however, possesses little authority, and who plays a prominent *rôle* only in time of battle. Under normal conditions the various tribes are split up into small hunting parties, who traverse the country in all directions in search of food, and who, on the appearance of an enemy, can be collected together in a very short time by means of special signals, made by the smoke of large camp-fires.

Such an itinerant hunting party of Indians, when on the march, forms a very picturesque spectacle. First come the able-bodied men, in single file. They are tall and magnificently proportioned, their skins of a deep coppery red colour. The only clothing they wear is a strip of

coarse cloth, tied round the waist like a kilt. Their long, glossy black hair hangs free over their shoulders, and contrasts with the waving white ostrich plumes with which it is decorated, and their faces are painted bright red. In his left hand each carries his bow and arrows. At the head of the procession there is usually some old and experienced pathfinder, and after him comes the chief. The rear is brought up by the women and children. The men, as we have seen, are unburdened, save by their bow and arrows. The women, on the other hand, are bent low under enormous burdens, for, on their shoulders, they support all the domestic properties of themselves and their husbands. Their dress resembles that of the men, except that they do not wear feathers in their hair, and their faces, instead of being painted red, are tattooed with a diamond-shaped pattern of dark blue lines.

On a halt being made, under the shade of a spreading *Algarobo* tree, the men recline on the grass, while the women hasten off to collect water from the *Karaguatá* plants, and to extract palm-cores for their lords' refreshment.

At night an encampment is made usually by the edge of a thick *monte*, which would afford a retreat in the event of a surprise. There are no huts or tents, and the Indians merely spread out their garments on the ground, and sleep without any covering, or at most sheltered merely by a mat strung up between two sticks.

Living such a life as the Tobas do, constantly liable to attack from enemies and wild beasts, their sensory powers are developed to a state of high perfection, their sight and hearing being remarkably keen: their higher intellectual powers, on the other hand, are but little developed. As regards the mathematical faculty, for example, it is rare to find an Indian able to count higher than six. Their *morale* is, on the other hand, remarkably high. They are exceedingly honest, faithful, generous, and brave; but it must be remarked that their entire moral code relates exclusively to dealings with their friends, and they do not consider any action can be wicked if directed against an enemy.

Having given a brief sketch of the Gran Chaco in its main physical aspects, I proceed now to say something of the history of Chaco exploration. It is a sad record in many respects, showing an enormous expenditure of human life, with but very slight resulting gain to our knowledge. Exploration in southern South America may be said to have commenced in 1506, when Juan de Solis discovered the estuary of the La Plata, which was for some time afterwards known by his name. Twenty years later Sebastian Cabot again entered its waters. On its banks he found Indians with a profusion of silver ornaments, and from this he christened the estuary in which he was the *Rio de la Plata*—"the River of Silver." At its upper end he found the mouths of two distinct rivers, and the western of these he followed as far as the mouth of the Bermejo. Cabot was thus the discoverer of the Paraná and Paraguay Rivers, and, we may say, of the Chaco. He planted settlements on the Rio de la Plata, and also on the Paraguay River, and colonisation at once began. In 1537, Juan de Ayolas navigated the river Paraguay to latitude 20° 40′, and was told by the Guarani Indians that there existed to the westward a

nation possessing great stores of silver. He thereupon resolved to march across in search of them. He penetrated far into the Chaco, and on his return, whilst traversing a marsh, was fallen upon by the Payaguás, and massacred, with all his men. Almost immediately after the tragic end of Ayolas, Alvarez Nuñez de Vera Cabeza de Vaca was appointed Governor of La Plata, and he, in a military expedition against the Guaycurús (1542), may be said to have inaugurated that policy of Indian extermination which is carried on to the present day.

Twelve years later we find the Chaco attacked from its north-west side, when the Viceroy of Peru despatched one of his officers, Andreas Manso, at the head of an expedition to attempt the conquest of the Chaco. He, however, merely managed to cross the Pilcomayo into the Chaco Central, and was surprised during the night by the Chiriguanos, losing his life with those of all his followers. Hence this central part of the Chaco received the name of Llanos de Manso. During the following century (the seventeenth) there is little to chronicle, save that the Jesuits, from their headquarters in Paraguay, sent numerous missionaries into the Chaco, whose efforts towards the permanent conversion of the Indians were quite fruitless, and many of whom lost their lives in the attempt. This and the eighteenth century were also characterised by several military attempts at Chaco exploration and subjugation, mostly at the instance of successive Governors of Tucuman, such as Angelo Peredo (1670), Urizar (1710), Espinosa (1759), Matorras (1774), and Arias (1780). These, however, I pass over without further comment, and I shall now restrict myself, from time considerations, to the exploration of the river Pilcomayo. We again find the Jesuits first in the field.

In 1721 Padre Patiño succeeded in penetrating a long way up the river, but was compelled ultimately to beat a rapid retreat by an attack from the Toba Indians, in which he lost several of his men. Twenty years later Padre Castañares made a somewhat similar journey up the Pilcomayo, and with similar result. And in 1785 Don Felix de Azara, the celebrated traveller and naturalist, ascended the river for a short distance.

The expeditions of the present century have been numerous, and I shall mention only the more important. Four of these started from Bolivia, and attempted to descend the river. Those of Magariños and v. Nivel (1843-44) were forced to return owing to the immense numbers of hostile Indians who menaced them on all sides. That of Crevaux, the celebrated botanist and traveller, has an especially sad interest attached to it. He started from Tarija in Bolivia early in February 1882, with only fourteen companions. They encountered large numbers of Indians during the early days of their journey, who appeared exceedingly friendly, and so inspired Crevaux's confidence that, it is said, he removed the strikers from the locks of his men's rifles to prevent them from alarming the Indians by firing. All went well until the afternoon of April 27th, when, as they were marching along in single file, a large number of Indians sprang on them from an ambuscade, and clubbed them to death, only one of their number, a boy, surviving to tell the tale. The last of the Bolivian expeditions was that of 1883. This consisted of nearly 200

well-armed men, and was accompanied by Dr. Thouar, a French explorer. It marched down more or less parallel to the Pilcomayo, and reached the river Paraguay after undergoing great privations, and a severe battle with 800 Indians.

The later expeditions of the river Pilcomayo have been those of Thouar, of Fontana, of Feilberg, and of Storm. The three latter have been all by steamer, and they have each succeeded in penetrating for a greater or less distance up the river, being eventually brought to a halt by want of water. I shall not dwell on them further, except to say that the last mentioned, that under Mr. Olaf Storm, has been the most fruitful in results. It entered the Pilcomayo on January 1st of 1890, and left it in the autumn of the same year.

I now come to the expedition which I accompanied, that of Captain John Page. Captain Page had been appointed to the command of the Pilcomayo-Bermejo river squadron by the Argentine Government; and one of the first works with which he was charged was the exploration of the river Pilcomayo. He left Buenos Aires on January 1, 1889, having under his command a flotilla of four vessels. Two of these, the *General Paz* and the *Caa Guazú*, were large stern-wheelers designed for patrol duty; a small screw-steamer, the *Perseverancia*, was furnished with powerful centrifugal pump, winches, and other apparatus for the removal of obstructions to navigation; while the fourth vessel, the *Bolivia*, was that destined for the actual work of exploration. The *Bolivia*, built in Paisley, had been constructed throughout with regard to the work that lay before her. Although nearly 80 feet in length, she drew only 18 inches of water; and her shallow, flat-bottomed hull was subdivided into numerous compartments so as to make her practically unsinkable. Accommodation for those on board was found in large deck-houses, which culminated in a tall wheel-house from which a clear view could be had all around, and on the summit of which was mounted a Maxim machine-gun. As the Indians of the Pilcomayo bore the most unamiable and bloodthirsty reputation, the *Bolivia* further carried a heavy armament of Winchester repeating rifles.

The expedition started, then, from Buenos Aires on New Year's Day of 1890. The first few weeks were spent on the voyage up the river Paraná, a muddy, rapidly-flowing stream, on an average from 2 to 3 miles wide. It is dotted with innumerable islands, low-lying and marshy, and reeking with malaria; and the absence of objects of interest, together with the myriads of mosquitoes, made this portion of the voyage very tedious. At length we arrived at Barranqueras (or Puerto Juarez Celman), on the Chaco bank, opposite Corrientes, where a pause was made to complete final preparations—time which I occupied in making various short incursions into the Chaco in its neighbourhood, sometimes by land, sometimes along the winding Rios Negro and Tragadero, which here enter the Paraná.

All arrangements being completed, we took on board the vessels our military detachment, consisting of fifty men of the 6th and 9th Regiments of Cavalry, under the command of Lieutenant-Colonel Racedo. Our bows were now turned northwards, and we entered the river Paraguay.

Leaving behind the immense expanse of the Paraná, and entering the narrower Paraguay River, one is at once struck by a curious distinction in the waters of the latter. Those on the western or Chaco side of the river are intensely muddy, and of a reddish yellow colour; those on the eastern or Paraguayan side are, on the other hand, dark coloured and clear. The explanation of this curious difference is soon found, for shortly after passing the Argentine village of Nuevo Timbó (Puerto Bermejo), we see a muddy torrent pouring into the river from the Chaco side, the waters of the Rio Bermejo. The engines are put to "full speed ahead," and we slowly forge our way through the entrance of the Bermejo, up which we are to make a trip for the sake of thoroughly testing the soundness and handiness of our steamer.

The entrance past, we find ourselves in an extremely tortuous stream some 120 yards broad, with its red waters rushing along at a rate of about six miles an hour. The banks are at first low, flat, and muddy, backed by a dense growth of the poplar-like composite tree known to the Argentines as *Palo bobo*. For about 15 miles they remain so, clad with the vegetation characteristic of lands liable to inundation. The banks then increase in height. They are quite precipitous, and are crowned with luxuriant forest consisting of *Urunday* (*Astronium juglandifolium*, Gr.), *Lapacho* (*Tabebuia Avellanedae*), and many other fine timber trees. Progress up-river is slow, owing to the terrific current, and on the morning of the 4th we pass Ñacurutú Island about 72 miles from the mouth (26° 26′ S. : 59° 41′ W.), and a little later arrive at our present destination "Puerto Expedicion," one of the line of forts along the banks of the Bermejo, which at present form the advanced line of defence against the Indians. A short halt here, and then the *Bolivia's* bows are put down-stream. Owing to the rapidity of the current, and the extreme tortuosity of the river, it is necessary to have as much command over the vessel as possible. This involves keeping our engines going full speed, and so we shoot down the river at the rate of nearly 20 miles an hour, occasionally grazing the bank by a few inches; and in six hours we are again on the Paraguay.

The Paraguay River, in this lower portion between the Pilcomayo and Bermejo, is very picturesque. Its waters are bounded on the western side by the dark, almost continuous forest of the Chaco, on the eastern by rich, open pastures alternating with patches of woodland, and here and there one of the characteristic Paraguayan villages of charming little cottages with low red-tiled roofs, often nestling in a grove of banana or orange trees, affording an intense relief to the eye so long accustomed to the monotonous architecture of Argentina.

On the afternoon of March 12th the *Bolivia* steamed into a quiet-looking creek on the western side of the river—the mouth of the Pilcomayo. We had seen this river marked on the maps as rivalling the Paraguay in point of size; we had read in the works of Argentine authors of its "copiosas ondas" rolling majestically along between its distant banks;—what, then, were our feelings on finding ourselves on an insignificant stream only some 60 yards in width, and with almost an imperceptible current. And small as was the river, yet the observant

eye might detect that it was far above its normal level. Intense tortuosity was its chief characteristic, far exceeding that of the Bermejo. Geologically speaking, and comparing it with the Bermejo, we may say that the Pilcomayo is a dead river. The Bermejo is continually hard at work as a geological agent. Its torrential waters cut and carve at its banks. At every bend the outer bank shows how it is constantly undermining and carrying away immense quantities of material; while the turbidity of its waters betokens the enormous quantities of solid matter which it transports to the Paraguay. Very different is the Pilcomayo. Its current is normally almost *nil*. Its waters are clear. Its banks are steep, but entirely covered with vegetation. The bare escarpments characteristic of erosion are here entirely wanting. The Pilcomayo, as a geological agent, has practically ceased to act.

For a week the *Bolivia* steamed along this winding creek. The high banks were crowned with luxuriant forest. Each morning a stoppage of an hour or two was made, and all hands put ashore to cut fuel. By ten o'clock or so a sufficiency of wood would be on board, the vessel would get under weigh and continue steaming till sunset. In this way the *Bolivia* made rapid progress; and on March 21st the expedition reached "Las Juntas," the meeting point of the two supposed branches of the Pilcomayo. Here, however, a serious blunder was committed, and the *Bolivia* entered the northern branch instead of the southern, which bore many signs of being the main channel. Almost immediately great difficulties beset our further progress: the river was now only about 20 yards wide, large trees sent their branches across, almost meeting those of the opposite bank, while the channel itself was sown with submerged tree-trunks. The axe and the differential hauling-gear had to be kept constantly at work removing these obstructions, and so our progress was of the slowest. But now a more formidable difficulty made itself apparent, for it became evident to every one that the amount of water coming down the river was rapidly diminishing in quantity. The water had up till this time been fresh and drinkable, but it now became salt and bitter in proportion as it diminished in volume. On the 1st of April, all the soldiers except six were put ashore in order to lighten the vessel, and with instructions to construct a stockade fort (Fortin Nueve).

The resulting diminution of the *Bolivia's* draught enabled her to make a little further progress, but still the water kept diminishing, and the *Bolivia* was brought to a full-stop. Captain Page now resolved on a rather novel method of enabling us to proceed in our progress along this majestic river. A stout embankment of earth, backed by palm-trunks and brushwood, was constructed with great labour right across the channel of the river. In a few days' time the level of the water had risen a couple of feet, and the *Bolivia* was able to steam triumphantly on her way. This operation was repeated in all seven times, and by its aid we achieved a distance of about 18 miles as the crow flies. Other difficulties now began to beset us. Our military escort had rejoined us on May 11th. They were at once set to work to construct a new fort which was named "Fortin Donovan" (lat. 24° 52′ S., long. 58° 40′ W.). We steamed on, leaving the soldiers to finish their labours, and

with instructions to be with the *Bolivia* again by a certain date. However, they did not turn up. Midshipman Page and a couple of men were sent down in the canoe to see how matters were getting on, and they found that the entire escort, including their officers, had vanished utterly. Supplies of provisions were by this time beginning to run low, and some opined that this might have something to do with the sudden departure of our gallant "escort."

As time went on the stores rapidly ran lower and lower, and rations had to be reduced all round. Various signs began to appear which betokened the presence of Indians hovering around the neighbourhood, and our armed watches were doubled, all of us taking the duty by turns. By June 14th lat. 24° 47′ was reached. Provisions were now running very low indeed, while the country all around consisted of palm forests, dry and parched, and saturated with salt, and so contained but little game. Captain Page now perceived the urgent necessity of at once despatching a commission down-stream to hurry up the relief-supplies which were said to be on their way to us. The construction of a canoe was set about, and on June 27th Leon Zorilla, Page's second, set off with a couple of men. Shortly after this Captain Page himself became seriously ill through the hardships and worry, and on July 30th he also left us in the sole remaining canoe, in the hope of being able to reach the outer world and recruit his strength. This, however, he was not destined to do, and, as we afterwards heard, he died on the river's bank fifteen days after leaving the *Bolivia*.

There was now but a little party left with the *Bolivia*, numbering ten all told, and utterly unfit in their then condition to offer serious resistance against an attack by the Indians. We knew that there were Indians all round us, but up till now we had received no indication of their presence close at hand. On the second morning after Page left, however, we discovered in the mud within twenty yards of the ship numerous footprints, with the wide-spreading toes characteristic of the savage. A number of axes and other carpenter's tools were also missing, and we knew that we had had a visit from the Indians during the night.

We had, as usual, been keeping an armed watch all night, but had heard or seen nothing to excite our suspicions. With this demonstration of the presence of the enemy we were compelled to redouble our vigilance, and to remain close by our ship. The provisions on board were now almost expended, and we lived almost entirely off our guns—very precariously, owing to the scarcity of game. Fortunately we killed an occasional deer, and this helped to keep body and soul together. One of our chief hardships was the want of fresh water. The soil was saturated with salt, and wells dug in it gave only undrinkable brine. At length, by making a well on the site of a dried-up marsh, we managed to obtain a little water—muddy but sweet; and when this ran out we had resort to the *Karaguatá* plants, of which there were fortunately a few in our neighbourhood. The men, however, became thinner and weaker every day. Dr. Vignoli, whose system had been weakened by a severe attack of malaria, and by subsequent hardships, gradually sank, and on September 8th he died. His comrades buried him by the margin

of the forest, and some of them wondered whose turn would come next. The whole party sank into a condition of gloomy apathy after this; but on the 18th of the month they were thoroughly roused up by the sudden appearance, as if from space, of twelve Indians close by the ship. Fully armed and in full paint and feathers, they made signs of friendship, which, after hastily snatching up our rifles, we replied to, and bade them advance. Two or three of us stepped ashore to meet them, and after a confab, carried on by signs and a few words of Guaraní, and greatly facilitated by the peace-pipe which we handed round, they left us apparently good friends. They stayed in our neighbourhood a couple of days, and brought us most welcome proofs of their friendship in the shape of an abundant supply of game, and then went off, saying they would return again another moon and bring with them many of their "little brothers."

The next event in our existence occurred on the morning of October 4th, when our ears were startled by a strange sound, which, so incredible did it seem, it took us a second or two to recognise as a distant bugle-call. A few minutes later the jingling of accoutrements was heard, and there rode up an officer and a long file of troopers in the familiar red cap of the Argentine cavalry; and we knew that we were rescued.

Our rescuers told us how they had reached us after a month's marching; of our leader's tragic end; how another expedition of thirty men had been despatched to relieve us three months before, and had not since been heard of; and also they brought us news of the outer world from which we had been cut off for so long a time.

The expedition, as an expedition, was thus at an end, and I will not occupy your time with telling you of the five months spent in the hope of a rise occurring in the waters of the river; how their tedium was relieved by many enjoyable experiences and stirring adventures amongst the Toba Indians; and how finally, in March 1891, I left the *Bolivia* and made my way across to Paraguay on muleback.

Thus the Page expedition, like so many of its predecessors, ended only in disaster. Its purely geographical results were comparatively small. It demonstrated, however, that the Pilcomayo is of no value as a waterway; it showed that, of the two branches that unite at Las Juntas, the southern is the more important, and that the northern branch is normally only a surface-drain, which receives water from, and communicates with, the main channel at its upper end only in time of flood. We are also forced to conclude that in a normally dry season the large volume of water coming down from the Andes *viâ* the Pilcomayo undergoes a continual decrease from evaporation during its journey across the Chaco, until at length, in about 24° 40′ S. latitude, it has become almost *nil* in quantity, and at the same time extremely salt and bitter; and that finally, as it passes through the comparatively well-watered and better-drained region bordering the Paraguay, its waters again undergo an augmentation in volume, while their saltness is diminished.

And now it only remains for me to say a word or two in conclusion: and first regarding the future of the Chaco. Most writers on the Gran

Chaco, basing their statements on a knowledge of only its peripheral portions, have sung its praises in unmeasured terms, and proclaimed it to be the "El Dorado" of the Argentine Republic. This judgment, confined to the zone bordering the fresh-water rivers is, I believe, perfectly just: we have there a beautiful climate, a magnificent deep alluvial soil, good drainage, and facility of access. Magnificent forests of most valuable timber alternate with pastures of the richest quality. This zone is pre-eminently fitted for colonisation. But the interior, and by far the larger part, of the Chaco is totally different. The usual utter absence of fresh water and the poorness of the soil and of the pastures make the country unfit for the agriculturist or the stock-raiser, while timber is comparatively scarce. Probably the Holywood and the *Cascarandá*, as timbers, and the *Ürira* as a textile plant, will be found almost the only productions of value in the interior of the Chaco.

Lastly, as to communication with Bolivia. Navigation of the Bermejo and Pilcomayo is, as I have shown, out of the question. A railway has been proposed along the banks of the Pilcomayo, but this would be prevented by the large expanse of country liable to inundation. There are, I believe, only two feasible projects of opening up communication with Bolivia through the Chaco: the first of these is by a railway along the northern margin of the Chaco, where the ground becomes higher and less liable to flooding, and the second is by the diversion of the waters of the Pilcomayo into a straight canal running roughly parallel to its course. Whether either of these will ever be carried out remains to be seen.

THE PRINCIPLES OF GEOGRAPHY.

By Hugh Robert Mill, D.Sc.

(*Abstract of a Paper read at the Anniversary Meeting, Dundee Branch, R.S.G.S., November* 1891.)

In connection with the recent new departures of the Education Scheme of the Royal Scottish Geographical Society, and having regard to the general recognition in England—though not in Scotland—of geography as a subject worthy of study in universities, it is appropriate to explain what modern geographers understand by the Science of Geography. It is no exaggeration to say that, when the idea of Geographical Chairs in our Universities was first mooted, many men, well-informed and eminent in science and literature, supposed, and some stated in modified words, that a Professor of Geography would be required to discourse solely on the countries of the World, the provinces, counties, parishes, cities, towns, villages, and hamlets thereof, together with the rivers, mountains, railways, canals, roads, and footpaths pertaining thereunto.

Readers of the *Scottish Geographical Magazine* well know that this is in no sense the conception of geography which now prevails. Geography

we hold to be the description of the Earth in relation to Man, in all the bearings of that relationship. It is one subject, and, to be effective, must be treated as such. The attempt to rend it apart into the isolated departments of Mathematical, Physical, Political, Historical, and Commercial Geography is thoroughly unsatisfactory. The severed limbs become unsightly, and ultimately shrivel into the bones, dead and dry, that have made the subject a horror in school and an object of aversion during life. Elementary instruction in geography is everywhere rapidly emerging from the repulsive stage: text-books have become interesting, and lessons are made permanently instructive; but the concrete teaching necessary in school-work differs widely from the abstract or philosophical treatment demanded when the subject is impressed with the guinea stamp of university recognition. The elementary differs from the advanced treatment much as the acquisition of the alphabet differs from the study of philology. In ancient times geography was viewed as the root-science, from which all others branched; now we prefer to view it as the focus at which all the physical and historical sciences converge to throw light on the World as an organic whole. It must be distinctly borne in mind that a deal of drudgery necessarily accompanies the early study of geography: the student must "know his bones" before he goes on to what old writers termed "the physiology of the World."

Evolution, as a principle of nature, has been shadowed forth from the earliest times, and its clear recognition, which has recently given an immense impulse to all sciences, enables us to treat of the Earth in a historical sequence, which traverses the entire field of geography, involving the results but not incorporating the methods of every detailed science. We cannot, however, view the history of the Earth as one unbroken chain; there are at least two gaps which science as yet cannot bridge, and these gaps appear to separate three distinct evolutions, each superimposed upon, and running parallel to, the preceding. It is scarcely necessary to point out that evolution does not in any sense negative creation. Evolution shows a constant drift of change in a definite direction—from simple to more complex, from lower to higher, irresistibly suggesting guidance and direction from without, while it never touches the question of origin at all. The three parallel chains of evolution each commence with an abrupt beginning. The origin of the physical universe, the origin of life, and the origin of that which distinguishes man from other animals—call it mind, or soul, or spirit—each requires, so far as modern science can ascertain, an act of creation by some power external to the physical universe. The three evolutions may be looked on as so many unfoldings of the plan and process of progressive creation.

The first, or physical, evolution commenced at the creation of matter and energy. As far back as trustworthy inference can reach, the universe appears to have consisted of minute separated portions of matter associated with energy, in the form of a tendency to approach one another. According to Lockyer's *Meteoritic Hypothesis*, the scattered fragments of cold dust sweep through space in swarms, which continually grow denser, and when two swarms cross each other's path the collision

of particles changes energy of motion into heat and surrounds them with a haze of glowing gas. This whirling cloud, or primitive nebula, cools by radiation, and in cooling contracts and condenses. The particles drawing closer together, the potential energy of separation is converted into heat, which causes the mass to glow with a higher temperature. Thus for a time the condensing star rises in temperature as it loses heat. Portions of the whirling and rotating mass split off in rings, which shrink into separate spheres retained in definite orbits round the central star by gravitational attraction. Such spheres or planets cool down fast at first, but, after a solid crust forms, the loss of heat is greatly hampered. The planets, being small, have by cooling become liquid or even solid, and no longer shine with their own light; but the sun—the central star of our system—continues to be surrounded with so voluminous a gaseous atmosphere that its temperature is possibly rising, and certainly not falling, on account of its loss of heat.

On each planet the available energy, the power of doing work, or of modifying matter, is divisible into two parts: its store of internal heat and its share of the heat radiated from the sun. Sun-heat is the more powerful on the surface of a planet situated at the distance of our Earth, and much depends on the manner of its incidence. As the Earth spins, turning once in twenty-four hours, half is always exposed to solar warmth and half is always cooling by radiation into space. Since the axis of spinning is not perpendicular to the plane in which the Earth pursues its path round the sun, most of the heat falls between the Tropics, while round each Pole the cooling process preponderates. The positions in latitude which limit the zones of heat and cold depend on the angle of inclination of the Earth's axis, and the variation in the intervals of daylight and darkness depends upon the same condition. As the Earth pursues the ellipse of its orbit, the furnace zone of tropical heat swings north and south, and the polar refrigerators alternately increase and diminish in intensity in the course of a year. If the Earth were of uniform surface, either land or sea, the temperature at any point would be a calculable function of the latitude.

When the Earth was much hotter than now, it must have been surrounded by a very dense and extensive atmosphere, but, as it cooled down, this atmosphere liquefied, and now only nitrogen, oxygen, and carbonic acid remain gaseous in large amount, mixed with an ever-varying quantity of water-vapour. It is possible that the hydrosphere, or ocean, once entirely surrounded the solid globe, the irregularities of the surface of which appear to have been once less marked than now. As the lithosphere contracted from the loss of heat, the cool crust became too wide for the shrunken nucleus, and, sinking in upon it, fell into broad wrinkles. The crests of these wrinkles gradually emerged above the hydrosphere, which gathered in the deepening hollows. The evolution of continents has recently been outlined by Professor James Geikie, who points out how the great world-ridges were first the site of scattered islands, and these, becoming united by upheaval, gave rise to continents. Internal heat-energy is always at work, deepening the hollows and elevating the ridges of the Earth's surface.

Simultaneously the differential attraction of sun and moon raise tides in the oceans, which produce powerful currents sweeping along the shores, breaking away and re-arranging the rock materials. More important still is the action of solar heat-energy, acting on the exposed rocks, and stirring up water and air into currents and winds that beat against the high lands and carry rain, which falls and runs back to the sea. The work done in this way wears the rocks into pebbles and dust, and transports the débris to the sea-margin, where wind-driven waves are also at work breaking down the coast-line. Thus solar energy by erosion is always wearing down the high places and filling up the hollows. New upheavals produce sharply-folded mountain ranges, ridged up from the beds of sediment, and arising, according to a common plan, near one edge or the other of each continent. By the contest between the opposite tendencies of upheaval and erosion, the typical configuration of each continent has been carved upon it, and the existing scenery has been gradually derived from the character and arrangement of the rocks.

The distribution of sea and land and the arrangement of mountain ranges divert the course of the sun-driven ocean-currents and winds and modify the system of oceanic and atmospheric circulation. The heating of the Earth is thus re-arranged; and it is calculated that one-half of the heat reaching the tropical zone from the sun is carried into high latitudes and distributed by soft sea-winds to less favourably situated lands. Rainfall and evaporation are greatly influenced by configuration, and by the resulting set of winds and currents.

The first chain of evolution leads almost to the completion of the Earth as we know it—a spinning ball, ridged into mountain-backed continents and isolated island-groups rising above the ocean, surrounded by another ocean of air, both oceans alike stirred and circulated by solar energy, which distributes rain over the land, that, gathering into rivers, has fashioned valleys and spread thick layers of soft soil over the slopes.

The second chain of evolution begins on the other side of the chasm which separates the not-living from the living. Physiographically, the change appears in the reversal of many physical processes. Carbonate of lime, for example, in the presence of living matter, separates out from sea-water as coral; whereas, in the absence of life, sea-water, in otherwise identical conditions, dissolves coral. Simple forms of life appeared first in the water, and, as age followed age, they increased in number and complexity, growing more diverse and more highly organised. Eventually the course of development diverged along two different lines, one resulting in the growth of plant-life, the other in animal-life. Plants, and plants only, have the remarkable power of utilising solar energy in the form of sun-light, and, through it, causing to combine the elements of carbonic acid, water, and various salts into living substance. As a bye-product in this manufacture, they throw out more oxygen into the atmosphere and withdraw more carbonic acid from it than is counterbalanced by the ceaseless respiration of the plants. Hence, vegetable life, of the higher kinds at least, tends to increase the amount of oxygen in air.

Animals are unable to utilise sun-light, and they cannot manufacture food from inorganic materials. Hence they depend entirely upon plants, directly or indirectly, for their nourishment. All living creatures are at the mercy of their environment, which, acting upon individual variations, ultimately brings the various species into their existing forms. Thus, in every natural region barred off from surrounding regions by mountains, deserts, or the sea, a more or less distinctive flora and fauna are found. Plants are most luxuriant where rainfall and sun-heat are at a maximum. Animals depend on the existence of vegetable food, but the two realms of life are very complexly interwoven, and the forms and numbers of plants and animals constantly oscillate about some position of equilibrium with their environment. Man is naturally classed as an animal, and, so far as regards the biological necessities of his life, he is completely under the influence of environment. But, in the marked contrasts between the mental and moral qualities of man and the other animals, we find evidence of another chasm, which separates the third evolution from the second. The impassable gap between the two chains is that man can consciously modify and direct the environment that moulds him.

The distinctively human attributes of man are visible in all varieties of the species, but they acquire more and more prominence in ascending the scale of evolution of civilisation. The classification of mankind is difficult, because the varieties of the one species are constantly mingling and varying, and various systems of classification—as, for example, by physical character and by language—do not lead to the same result. Looked at broadly, mankind may be grouped round three well-marked types: the black, the yellow, and the white. These stand in the order of their development in civilisation and in religious insight. While all varieties of the human family seem capable of some degree of mental improvement, there appears to be for each a certain limit in the development of civilisation which cannot be passed. Emancipation from the slavery of environment is a very gradual process, and the lower tribes of the present day probably represent the stages by which the ancestors of the more advanced laboriously approached the goal. To understand the relation of man to the Earth, of which he is the master, and to the command of which by him the triple course of evolution is directed, it is necessary to ascertain how far each different race has a hold on the region which it inhabits.

To the savage, in whom self-control and power over environment are at a minimum, thrift and forethought are unknown. He feasts when abundance comes, he starves when food is not found near to hand. In the very best conditions for perfect animal life the indigenous tribes of the human race seem to have made no progress in civilisation: the tropical representatives of the black type seem everywhere to have been smothered by the abundance of the means of life, and their minds have scarcely awakened to any but the primary animal wants. Food can be had without effort, clothing is unnecessary: so no effort is made and no ingenuity exerted. In the opposite extreme, as, for example, amongst the Eskimos, the extreme rigour of natural conditions stunts mental development. Completely fur-clad, skilled huntsmen, hardy fishers, and clever architects

in ice, these people have not found it in their system of life to step beyond the satisfaction of immediate wants. In temperate regions the regular recurrence of winter and summer, seasons of abundance and dearth, necessitate a certain amount of forethought ; the need for suitable clothing and shelter calls for skill and ingenuity ; and there is no doubt that the conditions of the temperate zone have done much in educating and civilising the highest types of man. The advancement to high civilisation came by imperceptible degrees, many of which may still be traced in primitive tribes : weapons and tools of wood and bone gave place to stone and bronze, and these to iron and steel. Hunting and fishing were less followed when the nomad herdsmen began to rear and feed domestic animals, improving their breed by artificial selection, and moving them on to fresh pastures. Greater advancement is found when agriculture is taken in hand seriously : land is cultivated, the amount and the quality of food-plants are increased, and the natural impulse of devouring the whole crop is controlled, men in years of scarcity voluntarily undergoing semi-starvation in order to save seed for an expected harvest. Lands of exceptional fertility are taken possession of by tribes strong enough to hold their own against competitors, until a stronger than they arrives and seizes control of people and crops. Necessity for defence in holding the common lands is a powerful bond in the formation of communities, and, from the merely passing interest in his habitat shown by the lowest savage, we find the higher races clinging to the region they have seized or inherited more strongly than to their own life. A community under a recognised form of government forms a nation, and a nation in possession of a region constitutes it a country. The boundaries of countries tend toward rigidity : the vague dominions of Uganda and Manica-land suffice for the aborigines in their ignorance, but precise lines of demarcation have to be drawn by the civilised rivals who divide continents between them at congresses. Animal and vegetable resources in a region alone excite the interest of primitive tribes, who only want food and clothing. And, in so far as food and clothing are primary requisites to all men, the fertility and character of the vegetation of regions must always be of paramount importance to the indwelling races. But as civilisation develops, new value is found in the land. Not the surface only, but what lies beneath attracts notice. Mineral resources come into play as an important factor consequent on the division of labour, which enables the farmer to feed the miner, and the miner to equip the farmer. The growth of trade, above all, brings out the high importance of every hillock of the land, every shallow of the sea, each small difference in climate and production in the World. Much of our knowledge of geography has followed from the expeditions of merchants in the past, until now traders reap their reward in the more minute subdivision of labour, and follow in the track of professional explorers.

Migrations or movements of large bodies of people may be regarded as of two kinds, according to their motive. The most common in the past have been centrifugal migrations, in which tribes were driven from a region by invasion or the failure of natural resources. This influence is still operative in the migration necessitated by overcrowding in thickly

peopled lands, and by persecution for religious or political opinions. The exiles of natural or arbitrary compulsion settle wherever they can. Many of the vast movements of savage hordes recorded in history were centrifugal migrations. Now centripetal migrations are perhaps more common. Men individually, but in large numbers, are attracted from all parts to regions of great natural advantage. The magnets of gold and diamonds have drawn hundreds of thousands to America, Africa, Australia; and rich farming-land is sucking population into western America.

The recognition of the limitations, the influences, and the motives of human life and movement in reference to the Earth is by no means complete as yet. It requires study and research, and it promises help of a practical kind in aiding commerce, interpreting history, and guiding the course of politics. The settlement, in particular, of such political questions as bulk largely in every country with regard to the equilibrium of composite populations, the autonomy, complete or regulated, of people of distinct race living in defined regions under one central power, are complex problems in advanced geography. Such problems may be worked out in many ways: by compromises, by the empiric application of former experience—the historic method—or by the careful study of racial and regional characteristics: that is, by the application of the higher geography.

It is not claimed that this statement of the position of geography is a *résumé* of universally conceded facts, and a promise of beneficial results sure to accrue from further study. It is indeed only an attempt to trace that essential unity of drift in the Earth as an organic whole on which the claim of geography as a distinct science rests. It strives only to show that man belongs to the Earth as the Earth belongs to him; that, in order to attack the problems of adjustment which beset our time, and will inevitably demand increased attention as time goes on, more knowledge of an accurate kind is desirable, and that this knowledge can be supplied when the scope and power of the science of geography are understood and advanced study is adequately recognised.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

The Right Hon. Lord Lamington read a paper on his recent journey in Indo-China at a meeting of the Society held in Edinburgh on the evening of 16th December last. Mr. Coutts Trotter presided. The Hon. Lord M'Laren moved, and Mr. T. R. Buchanan, M.P., seconded, the vote of thanks to the lecturer.

On the following evening Lord Lamington repeated his lecture at a meeting of the Glasgow Branch of the Society. Dr. Thomas Muir presided. Dr. Bottomley moved, and Mr. David Guthrie seconded, the vote of thanks to the lecturer.

On both occasions Lord Lamington's lecture was illustrated by lime-light views.

A joint meeting with the Edinburgh Chamber of Commerce was held in the Society's Hall, on the afternoon of 22d December. Mr. R. A. Lockhart, Chairman of the Chamber of Commerce, presided. Mr. Mounteney Jephson read a paper on "Trade Prospects in Uganda."

ESTABLISHMENT OF A LONDON BRANCH.

The following Memorial by the London Members of the Society was presented to the Council at its Sitting on 5th January :—

"We, the undersigned, Members of the Royal Scottish Geographical Society, resident in London, and neighbouring districts, request the Council to consider the advisability of establishing a Branch of the Society in London.

"The London Membership already numbers 70 ; but a very considerable accession of Members might reasonably be anticipated if a Local Branch were established. We should then enjoy privileges equal to those accorded to the Society's Branches in Glasgow, Dundee, and Aberdeen, where the membership, on the 31st October 1890, numbered 354, 100, and 76, respectively. These privileges, as we understand them, are at present confined to periodical or monthly meetings of the Society, from November to May, inclusive, and do not necessitate the establishment of a local Office or Rooms.

"We would suggest that a permanent Local Committee be appointed for London, consisting, as at the Branches in Scotland, of a President or Chairman, an Honorary Treasurer, an Honorary Secretary, and Ordinary Members of Committee, who would be responsible for all local arrangements.

"In the event of the Council acceding to our request, it will be our endeavour to promote the interests of the Society by introducing new Members."

The Memorial was signed by a majority of the London Members of the Society, including the following gentlemen, who had taken the initiative in the matter, namely :—The Most Honourable the Marquis of Lothian, K.T., Secretary for Scotland ; The Most Honourable The Marquis of Tweeddale ; The Right Honourable George J. Goschen, Chancellor of the Exchequer ; Sir Algernon Borthwick ; William C. Dunbar, Esq., C.B. ; F. Faithfull Begg, Esq. ; and The Honourable Claude G. Hay (Hon. Sec.).

The Council, having considered the matter, adopted the following Resolution :—

"That, with reference to the Memorial signed by a majority of the Members of the Society resident in or near London, praying for the establishment of a Local Branch, the Council unanimously agree to the foundation of a Branch of the Society in London on the same basis as that which supports the Society's Branches in Scotland."

The Society's head-quarters in London are at 20 Hanover Square, W., where the Ordinary Meetings will take place. The following Branch appointments have been made :—*Chairman*, The Marquis of Lothian (Vice-President, R.S.G.S.) ; *Hon. Local Treasurer*, Mr. F. Faithfull Begg ; *Hon. Local Secretary*, Honourable Claude G. Hay.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.

EUROPE.

The Lochs of the Caledonian Valley.—Mr. Thomas Scott, of the Fishery Board for Scotland, has lately been conducting a series of investigations into the depths, deposits, and fauna of the lochs of the Caledonian Valley, which form so large a part of the Caledonian Canal. We give below the principal results obtained. Unfortunately a succession of storms rendered it impossible to carry out the work to its full extent.

Loch Ness, which occupies the eastern part of the valley, is, with the exception of Loch Morar (*see* vol. iii. p. 316), the deepest body of fresh water in the British

Isles. Off Foyers soundings have been obtained up to 129 fathoms. The surface of the loch being 50 feet above sea-level, it follows that the bottom is over 120 fathoms below the surface of the sea, or deeper than any part of the North Sea within the British area, except in the extreme north. It is 26 miles long by about a mile wide. Salmon visit the loch, but angling, from some unexplained cause, is seldom successful, although the Oich and Garry, to reach which the fish must pass through Loch Ness, are both excellent sporting rivers. Mr. Scott began dredging off Castle Urquhart in 128 fathoms, using fine gauze within the net in order to prevent the escape of the smaller organisms. No obstacles, such as under-tows or currents, were met with, and, on being hauled up, the dredge was found to be quite filled with fine mud mixed with fragments of fine peaty matter containing pieces of partially decayed wood. This was emptied into a tub, and carefully examined by the following searching process. A quantity of the fine mud was put into a bottle with some water, and allowed to settle, when a distinct stratum of flocculent matter was observed above the mud, which, under the microscope, proved to be composed wholly of exuviæ of *Entomostraca*, chiefly of *Cladocera*. A quantity of the mud was then carefully washed through a fine muslin sieve, but, although fragments of *Entomostraca* were not uncommon, not the smallest trace of life could be observed. As a third experiment, part of the mud was dried and re-dissolved in water, but without the least evidence of life being obtained—that is, life existing at the time that the haul was made. Off Foyers, in the deepest part of the loch, the same results were met with. In Mr. Scott's opinion the peaty matter is the older and more compressed part of the deposit, the mud being of a newer and ever-increasing sedimentary layer at the bottom of the loch. Peat has been proved to be unfavourable to the existence of *Entomostraca*, more especially to *Ostracoda*, and hence the absence of these organisms in this sheet of water. Some dead tests of *Diatomacea* were seen among the peat, but were few in number. Tow-nets were worked near the surface, and at a depth of between 60 and 70 fathoms, capturing a number of *Entomostraca*, the results at both depths being similar as regards varieties of species, but it was observed that in the deeper haul *Bosmina* and *Diaptomus* were more largely represented than in that near the surface.

Loch Oich is about 4 miles long and half a mile broad. It varies in depth, the deepest soundings being towards the east end, where 23 fathoms have been found. It is studded with islets and shoals, causing its navigation to be both intricate and difficult in spite of the numerous buoys and beacons which mark out the track for vessels. The storm was so severe when Mr. Scott passed through this loch that dredging was impossible, but the tow-nets brought up the same organisms as those obtained from Loch Ness. Loch Oich is 100 feet above the sea, the river Oich flowing out of it into Loch Ness.

Loch Lochy, the last of these waters examined, is fully ten miles long by one mile wide, with a maximum depth of 76 fathoms. At this depth, and also in 40 fathoms, dredging was carried on, the results of the first haul being similar to those in Loch Ness ; the second attempt was a failure, the dredge coming up empty.

On the return voyage further investigations were made, but without any change in the results. Mr. Scott remarks that the examinations made were too few, and undertaken under too unfavourable circumstances, to enable him to say that living organisms do not exist in the deposits of these lochs. He considers it quite possible that they do occur, but if so, they are localised to such an extent as to require a careful and minute search before they are found. At the same time he points to the presence of peat in large quantities as likely to render the bottoms of the lochs exceedingly destitute of organic life. The tow-nettings gave, in all,

three species of *Copepoda* and six species of *Cladocera*. *Diatomacea* were frequent, especially *Asterionella*, and were most common in Loch Lochy.

The above account is abridged from a communication from Mr. Scott to the *Northern Chronicle* of 4th November 1891.

The Prosperity of Belgium.—The trade of this country, which in 1883 was of the value of £216,436,000, had in 1890 attained the value of £245,492,000. This is a larger sum than can be shown by either Italy or Russia. The revenue, in spite of the suppression and reduction of taxes, has increased from £12,200,000 in 1884 to over £12,700,000 in 1891.—*Mouvement Géogr.* Dec. 13th, 1891.

Corn in Russia.—The results of M. Borkofsky's study of the grain-production of Russia, pursued during a period of twenty-five years, are published in the last volume of the *Memoirs* of the Statistical Section of the Russian Geographical Society. With respect to this production Russia may be divided into two parts strictly dependent on her orographical structure. One of these, occupying the south-eastern slope of the broad swelling which traverses the country from north-east to south-west, yields in good years a quantity of corn twice or three times larger than the local demand requires. In the north-west, however, the local production has to be supplemented by importation. For the years 1882-85, when the crops were at an average, a line drawn from Kieff to Nijni-Novgorod would divide the exporting from the importing districts. The consumption in the former is 437 pounds per inhabitant and in the latter only 382. The average consumption throughout Russia is 430 pounds per inhabitant (from which 14 pounds must be deducted for the use of distilleries), a very small amount, if it be considered that the peasants consume very little meat. M. Borkofsky calculates that, if Russia exported no grain at all, the average consumption would closely approach that of France, 505 pounds per head, while the surplus during years of exceptionally good crops would only cover the deficit in bad years, which in the steppes of the south-east recur almost as regularly as in India.—*Science*, Dec. 4th, 1891.

The Observatory on Mount Blanc.—Under the direction of MM. Janssen and Imfeld, excavations have been made in search of a solid foundation for this observatory. In the month of August a horizontal heading, about 40 feet below the highest point, was driven into the ice-cap for a distance of 75 feet. At its extremity a second gallery of equal length has been excavated from east to west, that is, in the direction of the greatest length of the summit, but nowhere has rock been met with. Should all attempts to find rocky pinnacles at a moderate distance below the surface of the ice fail, it is M. Janssen's intention to erect a construction, compacted with the rigidity of a ship, on the frozen snow itself. In order to retain it in its normal position special machinery would have to be devised, which, by the pressure of screws, would counteract the horizontal and vertical displacements which constantly occur in the ice-cap. The building is to consist of two stories, of which the lower is to be entirely beneath the surface, while the upper is also to be partially buried. Should the observatory be satisfactorily established, it will then remain to be seen whether any observer is able to remain for a length of time at such an elevation.

ASIA.

Population of Hongkong—At the census taken in Hongkong on May 20th, 1891, the total population was 221,441, the increase since 1881, when the population was 160,402, being 38·05 per cent. (*Boll. della Soc. Geogr. Italiana*, Fasc. xi. 1891). In 1841, when the island was first occupied by the British, it was inhabited only by 2000 agriculturists and fishermen. The European and American inhabitants, including troops, number 8545. The largest proportional

increase has taken place among British civilians, being 84·46 per cent. during the decade. The number of Chinese has risen from 150,690 to 210,985, only 7,286 of whom are registered as natives of Hongkong. The population is less fluctuating than it formerly was, probably because, profits being reduced, it takes longer to accumulate a fortune. The population of Victoria has increased from 96,856 to 136,901. The number of steamers entering the port has risen from 2750, with a tonnage of 2,599,460, to 3989, with a tonnage of 4,791,839, while the number of sailing-vessels has declined to 125, their tonnage being 101,894. The revenue in consequence of greater prosperity, and not of additional or augmented taxation, advanced from £177,500 in 1881 to £309,080 in 1891.

Southern Sumatra.—The Orang-Ulu are a people living in the southern part of the island, who were visited by M. J. Claine during the summer of 1890 (*Asiatic Quarterly Review*, October 1891). In May he arrived at Palembang, formerly the capital of the sultans of Palembang and now the seat of a Dutch Resident. This town, containing a population of 60,000, composed of Malays, Arabs, Chinese, and a few Europeans, is situated on the Kuraa Sunsang, a branch of the Musi. Leaving Palembang in August, M. Claine ascended the Musi and its affluent, the Lemattang (Lamatang), to Muri-Enim (Muara Inim), about 186 miles from Palembang. Two days later the land journey was commenced, and, after a few hours' march, the country of the Orang-Ulu was entered by a bridge guarded by a group of natives. At Lahat the curious peak of Bukih Segello (Cerillo?) was photographed, and at Bandar, the last fortified post of the Dutch Government, a halt of two days was made. The country is mountainous and wooded, with here and there fine plains. The head-waters of the Lemattang run through profound gorges, and arborescent ferns afford a welcome shade from the burning rays of the sun. Soon after leaving Bandar M. Claine came in sight of the rich plateau of Passumah and the superb outlines of the Dempo, strongly marked against the sky, and came to a halt at Pager-Alam. The Ulu are very similar to the Malays in outward appearance and costume, but, never having adopted Mohammedanism, they differ in their habits. Each village is governed by a *Creo*, or chief, who wears, as a sign of authority, a pair of gold-woven pantaloons, provided by the Dutch Government. His power is very limited, all his acts being controlled by the elders. The chief occupations of the men are smoking and cock-fighting, while the women do all the hard work. They grow rice and coco-nut trees. The houses, like those in other parts of Sumatra and Java, are built on piles, and entered by means of a notched beam. The husband, on his marriage, is bound to enter the service of the wife's family. Marriage is celebrated with the following curious ceremony:—An immense balance, adorned with leaves, is placed before the house of the bride; in one of its wooden scales the parents deposit fruit, rice, fuel, coco-nuts, and a small kid, and in the other the bridegroom is bound to lay before sunset the gifts he makes to his intended. As soon as the scale dips in his favour, the girl leaves the house and approaches him, and the ceremony is concluded by a feast and dance.

On the 11th of September M. Claine set out with a Dutch officer to ascend the Dempo. Passing by the village of Gunong Agun, through a region abounding in tigers, they reached the summit on the second day, and then, crossing a long and narrow plateau, ascended the Merapi volcano, visited seven years before by Mr. H. O. Forbes. The barometer marked 9000 feet at the summit. From Pager-Alam M. Claine made a tedious journey across the Passumah plateau to Padang-Bornay and Talang-Padang, crossing the Upper Musi several times by bamboo bridges. At Tebbing-Teggi (Tingi) he took passage on a coffee *prauw*, and

descended to Palembang. The current is so rapid that it takes forty-five days to ascend the river, whereas three-fourths of the descent is accomplished in three days, and the remainder in four days and four nights.

The Kuro Shiwo.—The Equatorial current of the Pacific Ocean, striking against the Philippines and the islands lying to the south of that group, divides into two branches, one of which turns southwards to the coast of Australia, while the other, under the name of Kuro Shiwo, or Black Stream, flows past the Liu-Kiu Islands and the coast of Japan. Coming from the warmer Equatorial regions, its waters have a higher temperature than that of the sea through which it passes, and hence its limits may be determined by observations of temperature. Its breadth and velocity are greatly modified both by the monsoons of the Chinese Sea and by the storms of the Pacific. In fair weather the Kuro Shiwo flows in an almost straight line from the Van Diemen Straits to Rock Island, touching Oshima on its way. In winter it often lies considerably to the south of this limit, but the line from Oshima to Rock Island may be taken as its northern boundary. Its course is marked by seaweed and drift-wood, and also by the dark colour to which it owes its name. From Rock Island it runs past Nosima Saki into the Northern Pacific. On the northern edge of this stream no current is found as a rule, though occasionally a current in the opposite direction has been noticed. Between the zone where no marine currents are found and the coast of Japan tidal currents occur. The breadth of the zone between the Kuro Shiwo and the coast increases during violent northerly winds, and diminishes when southerly and easterly winds prevail. When the latter blow steadily and with great strength, the current sets more or less directly on to the coast, causing high tides, and it is then necessary for ships to keep a sharp look-out, lest they should be driven ashore. The zone of tidal currents extends for a distance of five to six nautical miles from the coast, and their velocity varies in general inversely as the breadth of this zone. At Oshima the tidal current is sometimes imperceptible, either because it is overpowered by the Kuro Shiwo, or because at that time it flows through the strait between Oshima and the main island.—*Annalen der Hydrographie*, Heft ix., 1891.

Cyprus.—This island, which may be looked upon as a British possession, since by the treaty of annexation it is to be evacuated only on the restitution of Kars and the other parts of Armenia conquered by Russia in 1878, is the subject of an interesting report by the Italian Consul at Larnaka, published in the *Boll. del Ministero degli Affari Esteri*, Sept.-Oct. 1891. Its greatest length, from Cape Andrea in the north-east to Cape Drepano in the south-west, is about 140 miles, and its greatest breadth, from Cape Kormakiti to Cape Gatta, 59 miles. Its area, according to the Cyprus *Blue Book*, 1889-90, is 3584 square miles (*Die Bevölkerung der Erde*, however, gives the preference to an older estimate of about 3700 square miles), and the census of April 1891 gives the number of inhabitants at 209,291, or 23,118 more than in 1881. Along the coast are many bays and roadsteads, the chief of which are Famagusta, Larnaka, Limassol, Episkopi, Khrysokhu, and Morphu. Two chains of mountains traverse the island; the one on the north runs for a distance of about 100 miles parallel to the coast of Asia between Capes Kormakiti and Andrea; the other, branching out in all directions, occupies all the west, and a large part of the south, of the island. The summits of the former barely surpass 3000 feet in elevation; the latter, called Olympus, culminates in Mount Troodos, 6406 feet high. This mountain and the mountains of Kykku in the same range are clothed with pines, firs, oaks and cedars, the remains of the ancient forests. Here the mouflon is still to be found in small numbers. On the upper slopes of Mount Troodos 20 square miles are covered with larch, between

Makhera and Papho grow pinasters mingled with clumps of holm-oaks, terebinth, etc., and near Papho are about 600 acres of young cedars of Lebanon. Elsewhere, with the exception of a few small woods here and there, the country is bare and a great part of it uncultivated, owing to the wastefulness of the inhabitants in cutting down whole trees for the sake of one small beam and the devastation caused by the goats. The Government, however, has turned its attention to the subject, and has established several plantations. The principal trees now found on the island, besides those already mentioned, are cypress, planes, poplars, nuts, carob, olives, arbutus, juniper, sumach, tamarisk, etc.

Cyprus is essentially an agricultural country. The *Blue Book* gives no indications of the number of acres under cultivation, but it may be inferred from the crops of 1889 that in that year about 148,000 acres were planted with wheat, 131,200 with barley, 17,820 with oats and vetches, and 13,000 with vines. The production of wheat increased from 54,800 quarters in 1879 to 268,522 in 1890, of barley from 111,800 to 310,016, and the other crops above mentioned show also large increases. Other important products are raw silk, grown chiefly in the district of Papho, and wine and spirits. Sumach, carobs, oranges and lemons, wool, hides, cattle and other animals are also exported in considerable quantities. The system of agriculture is of a very primitive description, mowing and threshing and other modern machines and implements being quite unknown, and no attempt is made to improve the breeds of cattle, sheep, etc., except, of late years, by the Government and foreign companies. The only native industry of any importance is silk-weaving, which gives occupation to the women of Nikosia. About 760 cwt. of sponges are fished up annually, almost exclusively by boats from the Greek Archipelago. At the present time there are about 490 miles of roads in Cyprus, all, with the exception of that from Larnaka to Nikosia, constructed by the British Government, but very few of them have bridges, so that, when the streams are swollen with rain, communication is difficult and dangerous. No railway has yet been made. No port is in a state of efficiency. At Famagusta the inner harbour might be made convenient for vessels at a comparatively small cost; large sums have been spent at Kyrenia, but the water is too shallow for vessels larger than Arab boats; while at Larnaka and Limassol jetties have been constructed which facilitate the disembarkation of passengers and goods in fine weather only, being unapproachable during storms. During the twelve months ending March 31st, 1891, the value of the exports amounted to £399,848, and of the imports to £274,123, the combined value being £114,819 greater than in the previous twelve months. The revenue is increasing, and everything seems to prove that the island is enjoying greater prosperity than under Turkish rule, and promises still greater progress in the future.

AFRICA.

The Kagera and the Kifu.—A map of the Kagera basin drawn from Dr. Stuhlmann's observations on his journey with Emin Pasha has been published in the *Mitt. aus den Deutschen Schutzgeb.*, Bd. ix. Heft 5. Emin Pasha's party set out from Bukoba on February 12th, 1891, and arrived in three days at Kitengule, having crossed a navigable stream, the Kyanyavasi. The country to the west of the Nyanza is a plateau 4000 to 5000 feet high, is very dry, and is covered principally with tall grass and acacias. In general the flora is very poor. The natives cultivate bananas, beans, *Eleusine*, and red durra. In a rock-basin intersected by the parallel of 1° 30′ S. lat. and the meridian of 31° 30′ E. long. lies the Ikimba Lake, with a small tributary from the east, but no outlet. This isolated hydrographic basin is separated from that of the Victoria Nyanza by the valley of

the Kyanyavasi. The Kagera is navigable up to Kitengule and beyond. The Akenyaru Lake, named also Lake Alexandra by Mr. Stanley, who heard of it from the natives, appears to have no existence, but the river probably has its ultimate sources in four lakes not far asunder, the largest of which is Kasangeni, the Little Windermere of Speke, situated at about 1° 40′ S. lat. and 30° 50′ E. long. About midway between Little Windermere and the Ikimba lies the Luenzinga Lake, rather smaller than the former. On Speke's map a lake is inserted to the north of Tanganyika, named Rusizi, and in later maps Kivo or Kovoe. This has hitherto been supposed to drain itself into Tanganyika, but Dr. Stuhlmann states that a river Kifu rises in Uhha, to the north-east of Tanganyika, and flows into the Albert Edward Lake, and therefore the lake, if it exists, is probably an enlargement of this river. More exact information concerning this, the most remote, source of the Nile will, no doubt, be shortly forthcoming.

AMERICA.

The New Lake in the Colorado Desert.—Mr. J. J. M'Gillivray, of the U.S. Mineral Survey, has reported on this lake and the manner of its formation. The following account is derived from *The Scotsman* of January 4th :—The Colorado Desert lies at a short distance to the south-west of the upper extremity of the Gulf of California, and covers an area of nearly 2500 square miles. It lies very low, being in some parts below sea-level. A few hundred years ago it formed a bay at the end of the Gulf, into which the Colorado flowed. But the river made in the course of time a bar with the large amount of sediment it carried, and shut off the bay from the Gulf. Then, its current becoming more rapid, it cut its way back into the land, not always in the lowest part, but where the formation of the ground was softest and most easily eroded, and, building its banks ever higher and higher, gradually formed for itself a secure channel. Meanwhile the waters of the shallow lake quickly evaporated in a country where the heat is intense and the humidity low, leaving behind a thick deposit of salt. Such was the state until last spring, when the river, being very high and carrying a large proportion of sediment, choked up its channel and overflowed into the old lake bed. The saltness of the waters of the new lake, which at first caused much astonishment, is due to the solution of the salts left behind by the old lake. The flooding of the desert will be beneficial to the surrounding country by increasing the general humidity. It has often been proposed to carry out by artificial means the work which has now been executed by natural causes. At present there seems to be no probability that the flow of water from the river will cease.

OCEANIA.

Population of Fiji.—*The Colonies and India*, December 26th, 1891, gives the results of the census of Fiji held on April 5th last. The population at that date was 121,180. During the decade there was an increase among half-castes, Hindus, etc., amounting to 7343. On the other hand, an aggregate decrease of 13,649 has taken place among Europeans, Polynesians, Fijians, and Rotumans.

German New Guinea.—In the autumn of 1890 Dr. C. Lauterbach made an excursion up the Gogol River, which enters Astrolabe Bay. At its mouth is a bar, which may be crossed at high-water by boats drawing not more than 8 feet of water. Behind the bar the river is 65 yards broad, but a little further up expands to nearly double that breadth, narrowing again to about 65 yards at a distance of 1½ miles from the mouth. Near the mouth the banks are flat and swampy. The river, flowing on the whole from WNW. to ESE. drains a large plain connected

with the Astrolabe plain by a narrow valley between the Oertzen Mountains, on the south, and a range of hills, 300 to 600 feet high, which runs along the northern bank. Dr. Lauterbach ascended the river to a distance of 45 or 50 miles. Here the range of hills appeared to merge into an elevation over 3000 feet high, lying at some distance to the north, while to the north-west, in the direction of the river, another still higher mountain was observed. Mountains visible at a much greater distance to the south and south-west were supposed to be the Bismarck range. There are two tributaries of importance, the Elizabeth, so named by Herr Kindt, which flows from the Oertzen Mountains, and enters the parent stream at no great distance from the mouth, and the Gui, which enters on the left bank about half the journey up the river. The country is covered with dense woods interlaced with rattan, so that the party could advance only a few miles per day. Palms are particularly conspicuous along the lower course of the river, and the wild bread-fruit (*Artocarpus incisa*) is found everywhere. Coco-nuts and papaya are also plentiful. There is a large variety of birds, and the flying dogs are innumerable. The party had a slight skirmish with the natives on the Elizabeth River, but elsewhere friendly relations were soon established. Iron seemed to be quite unknown in the villages higher up the river. Here the population is very dense. The maximum temperature recorded between October 26th and December 9th was 91°, and the minimum 73°.—*Nachrichten über Kaiser-Wilhelms-Land*, Heft 1, 1891.

GENERAL.

Professor Geikie on the Glacial Period.—On November 12th the Edinburgh Geological Society held its anniversary meeting, at which Professor Geikie delivered his presidential address, the subject being "Supposed Causes of the Glacial Period." The lecturer began by remarking that, although the subject of his address had frequently been canvassed, the last word had not yet been said. The question of the cause or causes of the Ice Age was indeed a hard one, and he was not going to advance any novel speculation or hypothesis on the subject. His object was rather to examine certain views, which, after having been abandoned as untenable, had again been put forward to account for the phenomena of the glacial period. Before attempting to criticise these views, it was obviously necessary to ascertain, in the first place, what conclusions had been arrived at with regard to the climatic conditions of glacial or Pleistocene and post-glacial times. We must first have an adequate conception of those conditions before we could estimate the value of any theory of their origin. The climatic conditions of the Pleistocene were then considered. It was shown that at the climax of the so-called glacial period the line of perennial snow in Europe was depressed for not less than 3500 feet on an average. To bring about such a depression, the mean annual temperature must have been lowered 10 degs. or thereabout. Full consideration of all the glacial phenomena led to the following conclusions :—(1) That the cold of the glacial period was a general phenomenon due to some widely-acting cause—a cause sufficient to influence contemporaneously the climate of Europe and North America. (2) That glaciation in our continent increased in intensity from east to west, and from south to north. (3) That, where now we have the greatest rainfall, in glacial times the greatest snowfall took place. (4) That in the extreme south of Europe, and in North Africa and South-Western Asia, increased rain-precipitation accompanied lowering of temperature—from which it might be inferred that precipitation in glacial times was greater, generally, than it is now. The remarkable climatic changes of the glacial or Pleistocene period were next considered. It had been proved that the period was interrupted certainly once—perhaps, as many geologists maintained, at least twice—by what were known as inter-glacial conditions. The evidence of

this was treated in considerable detail, and the character of the inter-glacial climate was described as being markedly temperate and genial. There could be no doubt whatever that the Pleistocene period was characterised by great oscillations of climate—extremely cold and very genial conditions alternating. The evidence of the post-glacial beds showed likewise that these had been accumulated under similar, but much less marked, alternations of cold and temperate climates. Lastly, attention was directed to the fact that both in Pleistocene and post-glacial times changes in the relative level of land and sea had taken place. Any suggested explanation which did not fully account for these various climatic and geographical conditions could not be satisfactory. The view which had met with considerable acceptance, especially by American geologists, was that which attributed the phenomena of glacial times to great movements of the Earth's crust. Professor Geikie then proceeded to examine that "earth-movement hypothesis" in detail. He pointed out that in the first place there was not the least evidence of great continental elevations in the northern Hemisphere, such as the hypothesis postulated. Next, he showed that even if the desiderated earth-movements were admitted, they would not account for the phenomena. Each of the several applications of this earth-movement hypothesis was criticised in succession, with the result that they were all found inadequate. Neither great elevation of the northern lands alone, nor such elevation accompanied by submergence of the Isthmus of Panama and the deflection of the Gulf Stream, would account for the peculiar conditions of the Ice Age. These changes, no doubt, would profoundly affect the maritime regions of North America and Europe, but they would not reproduce the conditions that obtained at the climax of the Ice Age. Another objection to the earth-movement hypothesis was this, that it did not account for inter-glacial conditions. The advocates of that hypothesis imagined that those conditions would supervene when the highly-elevated northern regions were depressed to their present level, and when the Isthmus of Panama reappeared. But these were precisely the conditions that obtained at the present time, and yet in spite of them the climate was neither so equable nor so genial as that which obtained in inter-glacial times and during the mild stage of the succeeding post-glacial period. The earth-movement hypothesis must be rejected, not only because it was highly improbable that such wonderfully rhythmic elevations and depressions of high northern lands and of the Isthmus of Panama could have taken place, but chiefly because it did not explain the conditions of the glacial period, while it practically ignored those of inter-glacial times. Professor Geikie next considered the proofs of former submergence which are so abundantly met with in temperate and northern latitudes, and discussed the various views which have been advanced to account for the facts. He concluded his address by considering an objection which had been urged against the physical theory of the glacial period as advocated by the late James Croll. This objection was based on certain estimates of the rate of erosion of river-valleys, the accumulation of alluvial deposits, and so forth, from which it was sought to show that only some 7000 or 10,000 years had elapsed since the close of the glacial period. The consideration that, if this contention were true, it would bring the close of the Ice Age down to the dawn of civilisation in Egypt was rather startling, to say the least. The fact was, however, that all such estimates, however carefully made, were unreliable. Dr. Croll's theory might some day be supplanted by one more satisfactory, but it would not be overturned by niggling and inconclusive measurements of that kind. That theory holds the field in giving the simplest and most consistent interpretation of the climatic vicissitudes of the Pleistocene and post-glacial periods, while it is the only one that throws any light on the very remarkable conditions that obtained during inter-glacial times.

Displacement of the Earth's Axis.—The observations in Germany which revealed the fact that the Earth's axis changes its position were referred to in the *S. G. M.*, vol. vi. p. 387. This phenomenon has been confirmed by more recent investigations. At the meeting of the International Geodetic Union in 1890 it was resolved, on the motion of Professor Förster, to send an astronomical expedition to Honolulu, which is within 9° of the meridian opposite to Berlin, for the purpose of making a series of observations corresponding to those of the Berlin Observatory. The result of three months' observations, as stated to the Royal Society by Sir William Thomson (*The Times*, Dec. 1st), is that it has been proved that the latitude of Berlin increased by one-third of a second during this period, while the latitude of Honolulu diminished by almost exactly the same amount. In order to determine accurately the direction and amount of these variations, it is proposed to establish four permanent stations at places approximately in the same latitude and on meridians 90° apart. The reason for this arrangement is that, should the position of the axis of rotation be changed in a plane perpendicular to the meridian of a station, the alteration would not be detected there, but would be most perceptible at a station 90° of longitude to the east or west.

Artificial Production of Rain.—It is a very old belief that battles bring down rain, and a new edition of a book on this subject, issued in 1890, aroused so much interest that the Congress of the United States granted a sum of money for the purpose of carrying out experiments to test the possibility of producing rain by means of explosions. The officials of the Agricultural Department, to whom the task of making experiments has been intrusted, seem to have little hope of obtaining reliable results. The *American Meteorological Journal*, June 1891, gives extracts from the report of Mr. Fernow, in which the writer points out that, in the present state of knowledge regarding precipitation, it is impossible to draw up rules for the management of the experiments. What kind of explosive should be used, and at what height from the ground the explosion should take place, whether intensity or frequency of explosion is more likely to produce the desired effect, are questions to which no answers can be given. And if rain follows, how can it be ascertained whether it is the effect of the explosion? As regards the action of battles and fires, the evidence is by no means conclusive. Volta, indeed, proposed to use fire for the opposite purpose—to disperse thunderclouds; and Mr. H. C. Russell, in 1884, calculated that, in order to increase the rainfall of Sydney by 60 per cent., 9,000,000 tons of coal would have to be burned daily.

MISCELLANEOUS.

From February 1st **Zanzibar** will be a **Free Port** for all articles except ammunition and alcohol.

A new publication entitled **Le Congo Illustré** is now being issued from the office of the *Mouvement Géographique* in Brussels. It is a fortnightly periodical: the first number appeared on December 25th.

Telegraphic Communication is to be established with the **Bahamas** by a cable 200 miles long, extending from a point about 5 miles from Nassau, in New Providence, to the south-east coast of Florida, near Jupiter Inlet.

A section of **Railway** has been opened in **Burma**, running from Sagaing, near Mandalay, to Shwebo, in the valley of the Mu, a distance of 53 miles. Ultimately this line will be carried to Mogaung.—*Revue Française et Exploration*, Dec. 1st, 1891.

Captain Binger embarked on December 25th for Assinie. He is appointed Commissioner for the delimitation of the **British and French Territories** on the Gulf of Guinea. Captain Lamb is the British Commissioner.—*Mouvement Géographique*, Dec. 27th, 1891.

A New Port has been opened at **Bocas del Toro**, 120 miles to the west of Colon. Situated in Almirante Bay, it will serve as an outlet for the products of the rich province of Chiriqui, and may become one of the most important ports of the Republic of Colombia.—*Bull. Consulaire Française*, Oct. 1891.

Señor Carlos Fry has discovered a **Short Route across the Andes**. It leads from Chancahuayo to a good port on the Pichis, one of the navigable tributaries of the Amazons. Señor Fry affirms that a score of workmen could construct a road in six months.—*Le Tour du Monde. Nouvelles Géographiques*, p. 416, 1891.

A large and influential meeting was held on December 7th, to establish a **Geographical Society for Liverpool**. The Right Hon. the Earl of Derby was elected President, and a Council was appointed. Seven or eight hundred gentlemen have already promised to join the Society, which will devote its attention chiefly to commercial geography. Mr. George A. Craig, who for some years filled the post of Assistant Librarian of our Society, has been appointed Secretary.

We have received from the Imperial Russian Geographical Society "**Beobachtungen des Russischen Polarstation auf Nowaja Semlja. 1 Theil: Magnetische Beobachtungen.**" This is a report of the work done by an expedition sent out to Little Karmakul under Lieut. C. Andrejeff, during the months October 1882 to August 1883. Being published in German as well as in Russian, it may be consulted by a larger number of students.

In the *Mitt. der Geog. Gesell.* in Hamburg, Heft 1, 1891-92, Dr. Georg Gürich describes the geography, ethnology, fauna, flora, etc., of **German South-West Africa**. As Dr. Gürich's researches, in 1888-89, into the mineral wealth of the country led him for the most part into the inhospitable and sparsely populated mountain lands lying between the inland plateau and the Atlantic, his work forms a counterpart to that of Schinz, whose field of exploration lay more to the east, in the interior.

NEW BOOKS.

Anthropogeographie. Zweiter Theil: Die Verbreitung des Menschens. Von Dr. Friedrich Ratzel. Mit einer Karte und 32 Abbildungen. Stuttgart: Verlag von J. Engelhorn, 1891. Pp. xlii. + 781. *Price M.* 18.

We cannot be said to have a complete and scientific knowledge of any natural phenomenon unless we are acquainted with all the causes which have combined to produce it and their mode of action. It is not enough to know the present phase: we must trace the phenomenon through its successive stages before it reached its existing condition. This is pre-eminently true of the Distribution of Man, and therefore we venture, even in spite of Dr. Ratzel's reflection on method-mongers, "who, without putting a hand to it themselves, wish to show us how it should be done," to maintain that only by the historical method can a full and accurate idea of the subject be obtained. The agencies which have played their part in the peopling of the World are so numerous and diverse, and enter into such a variety of combinations, that it is impossible to treat of each separately,

especially as their influence on the human race and their relative force change from century to century—nay, from decade to decade. Some of the remarks in Dr. Ratzel's preface would lead the reader to suppose that he took the broadest possible view of his subject, and would prepare him to expect, under the heading *Hologeic View of the Earth* (*hologäische Erdansicht*), a scheme for a complete Science of Man, in which all the terrestrial forces affecting the life of man should find a place. But the term is explained to mean simply that the Earth is a spheroid of certain dimensions, and that only a portion of its surface is adapted for human habitation—indisputable facts which must be accepted as axioms and are constantly assumed by authors, though not stated in set terms. Many of the subjects which we miss in the present volume are probably discussed in the first part of the *Anthropogeographie*, or will be expounded in future parts. But our contention is that such separation is an error. Even in this single volume, the field of which is stated in the preface to be *statical* anthropogeography, this defect is apparent. The site of a city, for instance, is determined by a variety of circumstances, such as climatic conditions, physical features, strategical advantages, etc., for the treatment of which we must search in different parts of the volume—a search of no little difficulty in the absence of an index. The work is divided into four sections. In the first the bounds of the Oikoumenê are admirably traced. In the second part, *The Statistical Survey of Mankind* (*statistisches Bild der Menschheit*), there are several points to which objection might be made, and, perhaps too much space is devoted to criticism of maps showing density of population. On the other hand there are some excellent chapters, especially those on the estimation of population in uncivilised lands and on the density of population. Here, however, is to be found one of those unconsidered utterances which Professor Ratzel occasionally allows to slip from his pen, and one which furnishes a good illustration of the disadvantage of the separation of causes already alluded to. He affirms that population has a tendency to become denser in islands, and, in confirmation of this statement, makes a comparison, among others, of the population of Gibraltar (essentially an island), Hongkong, Barbadoes, Bermudas, and Mauritius, with that of the British Colonial Empire—that is, between certain selected islands and large areas, including vast uninhabited, or very sparsely inhabited, territories. Gibraltar and Hongkong are peculiarly out of place in such a comparison. Gibraltar is certainly alluded to some 200 pages further on as a harbour and military station on the high-road to the East, but we can find no mention of Hongkong as a great commercial emporium, under British rule, at the mouth of a large Chinese river. Again, Ireland is referred to as the only over-populated country in Western Europe, but no explanation is given of the fact that the island supported a far larger population even at the time when its trade and industries were hampered by legal restrictions—perhaps because the question lies beyond the range of *statical* anthropogeography. The third section, on the *Footprints and Works of Man on the Earth's Surface*, contains chapters on human settlements and towns, where a large quantity of valuable material is collected, not always, however, well digested or viewed from a correct standpoint. The argument almost throughout the first two chapters of the fourth section, on the *Geographical Distribution of Racial Characteristics* (*Völkermerkmalen*), is destructive. In these Dr. Ratzel discusses anthropological and ethnographical characteristics, showing that races with approximately the same form of skull, colour of hair, etc., are found scattered about over far-removed portions of the Earth's surface, and that ethnographical and linguistic peculiarities do not necessarily indicate fundamental distinctions of race, so that no conclusions can be based on them with regard to the distribution of mankind. Only in the few cases where two peoples possess a

large number of ethnographical objects in common, or a similarity of systems for reckoning time, etc., that can hardly have had an independent origin, will Professor Ratzel allow that any connection between them may be legitimately assumed. These chapters contain many interesting and pertinent remarks, but some of the author's positions will doubtless be attacked by anthropologists and ethnologists. Anthropological as well as ethnographical distinctions gain strength by combination, and when we find such similarity as between the dwarfs of Africa and the Negritoes of the Eastern Archipelago in cranial structure, stature, colour of hair, and low state of civilisation and intellectual development, we can hardly avoid the conclusion that they are fragments of the same primitive race. On ethnographical charts many adverse criticisms are passed, but Professor Ratzel practically shirks the solution of the difficulties connected with them by advocating the use of maps on a small scale, which admit of only slight differentiation.

The space at our disposal is too limited to do justice to the merits or to enlarge on the demerits of a work of such magnitude. Perhaps undue prominence has been given to the latter, for, along with some captious criticisms, truisms set forth with all the solemnity proper to the annunciation of newly-discovered fundamental principles, and an occasional want of accuracy, this volume contains a number of very suggestive passages and a vast store of learning, bearing the impress of unsparing toil and thought, though not presented in such a form as to lead directly up to general principles and definite conclusions. Few, perhaps none, however well acquainted with the subject, could rise from the perusal of this book without feeling that their stock of ideas was considerably increased.

English Colonisation and Empire: University Extension Manuals. By A. Caldecott, M.A. London: John Murray. Pp. 277. *Price* 3*s.* 6*d.*

This volume is well worthy of inaugurating a series (as with three others it does) issued by Mr. John Murray for the use of University extension students: and we bespeak for it a wider range of usefulness. The field entered by Mr. Caldecott is very extensive, and the liberal sympathies of the author have done nothing to contract it. Rather is the course of events broadened by a mind well-informed on matters of past and present politics, Colonial and Imperial, and on the problems, economic and other, which lie at their root. Mr. Caldecott is a Cambridge graduate, and throughout the work one can perceive the influence of the labours, and much especially of the spirit, of Professors Seeley, Sidgwick, and Marshall. Well-balanced judgments are typical of that spirit and of this work. Let these words convey our favourable impression of the book. It is merely with the desire of seeing it still better that we point out a few inaccuracies, believing that such a book as the present, intended for readers who may not have access to authorities and works of reference (although Mr. Caldecott gives a judicious list in an appendix), should above all things else be scrupulously accurate.

The date of Poynings' Law is given (p. 7) as 1479, instead of 1494. It is a loose and dangerous mode of thinking and expression to include (1) India (p. 9) and (2) mere factory establishments (p. 11) as colonies. "The seven kingdoms of the Heptarchy, the principality of Wales, and the various chieftaincies of Ireland had for some time [*sc.* before the reign of Elizabeth] been united" (p. 9) is a curious chronological combination, and, as a statement, almost purposeless. The foundation of the Royal Exchange should have been included in a sketch of the development of England under Elizabeth. The Spanish Succession War began in 1702, not in 1704 (p. 36). War with Spain was entered upon in 1739, four years before the author's date (p. 37). "Gradually the Austrians had begun to feel that France was their true friend" is vague, and furnishes no indication of the famous

diplomatic revolution effected in European relations between 1748 and 1756. In an able review of our connection with our American colonies Mr. Caldecott does not allow sufficiently for England's mistaken commercial policy : we made the mistake, as Arthur Young remarked, of dealing with the colonists on "the maxims of the counter." It is not easy to see why past successful relations towards the French-Canadians should make Mr. Caldecott wonder (on p. 103) why we have not succeeded in Ireland : are the cases analogous? Again, it is misleading to refer (p. 144) to the federation of the British Empire as if it were on a similar footing to the unification of Italy and Germany, and other contiguous territories. On page 263, President Monroe (of the "Monroe doctrine" in United States history) is written "Monro." Several grammatical errors (*e.g.* p. 16, last line ; p. 96, l. 4 ; p. 99, l. 11 ; p. 144, l. 10 ; p. 242, l. 11) disfigure the pages of the book. Occasionally, as in the presentation of summaries, the style suggests too forcibly that of an examination manual ; it is fair, however, to add that usually this is due to a wealth of fact, illustration, and inference. These are mostly insignificant shortcomings ; and to our introductory words of praise we must further add an expression of our gratification at the inclusion in the volume of numerous maps and illustrative diagrams.

The New Empire. By O. A. Howland, of Osgoode Hall, Barrister-at-law. London : Edward Arnold, 1891. Pp. 608.

Although it cannot be conceded that Mr. Howland's book fully justifies its title, it must be admitted that some of the most vital aspects of the death of the old and the birth of the new British Empire are treated in a masterly manner. The author has a certain forensic force and grace of diction which make his book eminently readable. His standpoint is that of a loyal Canadian, and his early chapters may be read with much profit by the people of the United Kingdom, although he modestly disclaims any title to originality of treatment.

It is possible that the various chapters or sections (there are only five) of his work were written at widely different periods, and that they were subsequently christened with the name of the book. This is the only explanation we can find for the lack of balance, which is the chief fault of the book. Its value lies in the discussion of a very vital question—the political future of Canada. Without attempting to explain or criticise his views we may accept them as reasonable and sound from the point of view he adopts, but open to many objections by those whose horizon is wider.

Australian Federation : Its Aims and its Possibilities. By Howard Willoughby. Melbourne : Sands and Macdougall (Limited), 1891. *Price* 2*s.*

The author of *Australian Federation* writes as one who is thoroughly in earnest regarding the subject, who has studied it carefully, and who is familiar with all its phases. Its chapters are to a large extent, especially in the first portion, reprints of newspaper articles, and are marked by the rapid and sketchy style and the fragmentary character that befit that kind of composition. They do not form a systematic treatise, but are rather a series of "views" of different aspects of the question, so arranged as to give a certain continuity to the narrative. The second part, containing a digest of the proposed constitution, and a review of the National Convention held at Sydney in March last, is more methodical. The whole book will be found exceedingly valuable by those who are interested in the subject. It contains a large amount of useful information, including official statistics. The cross-lights drawn from America and elsewhere are instructive. The discussion of moot points is conducted with fairness and intelligence.

Episodes of Anglo-Indian History. By W. H. Davenport Adams. London: E. Marlborough and Co. Pp. 348. *Price* 5*s*.

The compiler of these pages has not lived to reap the fruits of his labour. As a writer he has done something to popularise English literature and certain incidents in history. The present work is on similar lines, and calls for no special notice. We do not, in fact, quite agree that a "compilation such as the present" was really called for. Most readers will prefer to get as near as possible to the authorities for the picturesque and romantic details of our early struggles in India, and of our later connections there; while, for a convenient summary of historical events, the manuals of Hunter, Lethbridge, Wheeler and others are at hand. The work before us does not reveal much historical insight: hardly at all do we discover breadth of view; there are faults in points of historical detail, as on page 6, where one is led to infer that the two East India Companies were fully consolidated in 1702, and on page 39, where the beginning of the Seven Years' War is ascribed to 1754. The author's orthography of Indian names is by no means trustworthy, and his geography is not perfectly accurate.

Pioneers of Civilisation. By John Tillotson. New and Revised Edition. London: John Hogg. n.d. Pp. xi. + 320. *Price* 2*s*. 6*d*.

This is an excellent popular compilation, giving brief but succinct accounts of the work of Europeans in the spread of civilisation in all parts of the globe. The arrangement of the pioneers into classes is good, and, to some extent, makes the want of an index less felt than would otherwise be the case. Mr. Tillotson is careful to quote his authorities, so that readers wishing to know more of any of the adventurers whose lives he describes, need have no difficulty in consulting original and exhaustive accounts. The narrative is brought down to date by an additional chapter on Emin Pasha and his administration in Equatorial Africa; Stanley's march through the great forest, etc. The book is well printed, but the illustrations are rough.

Du Niger au Golfe de Guinée par le pays de Kong et le Mossi. Par le Capitaine Binger (1887-1889). Ouvrage contenant une carte d'ensemble, de nombreux croquis de détail et 173 gravures sur bois d'après les dessins de Riou. 2 tomes. Pp. 513 + 411. Paris: Librairie Hachette et Cie, 1890.

The journey of which these volumes contain the detailed narrative was described at considerable length in this *Magazine* for April 1890. It was an important journey, politically and geographically. The mission of France, the writer tells us, is to extend her sway "from Senegal to Lake Chad, and from Lake Chad to the Congo," and one section of this extensive programme has been carried out by Captain Binger, *i.e.* he has made treaties, up to a certain limit eastward, with the chiefs of all the lands which lie between the French sphere of influence to the north, about the Upper Niger, and the settlements on the south coast. The serious side of the question for our own mercantile community is that the treaties made appear to stipulate the exclusion from these protected territories of British goods.

On the physical features of the country a good deal of light has also been thrown by Captain Binger's observations. A great plateau, or series of plateaux, seems to extend for some distance between the tenth and eleventh parallels and still further south. From the western portion of this tract the streams appear to flow both north towards the Bagoë, a tributary of the Niger, and south towards the Comoë. In fact, it was asserted that two such streams flowed from the same morass not far from Dioumanténé (Pomporo), but Captain Binger was unable to substantiate this.

On arriving at Kong the writer could not discern a trace of the mountains said to lie in that neighbourhood. "On n'aperçoit même pas une ride de collines." But on leaving Kong he says the land rises sensibly to the east, and there are ranges of wooded hills on the horizon behind which, after four days' journey, the peak of Komono is visible. This peak, however, according to his map, lies nearly due north from Kong.

The river Volta is also now definitely known to have its sources much further to the north than most maps have hitherto indicated.

The writer gives much detailed information as to the articles of import and export at the *entrepôts* he visited,—gold, salt, and the kola nut being the chief produce of the country. The regions where these are chiefly found are also laid down, as are the zones within which the different vegetable products are grown.

The book also contains much ethnological information of value, the subject being one on which the writer's previous studies and experience give him a claim to speak. His account of the gradual advance of the two most capable races, the fair Peul or Fulbé (as to whose place of origin so many theories have been advanced) and the Mandé, is especially curious. The balance of advantage lies, he considers, with the latter, who are the leading race at Kong. Although disapproving of war, they practically absorb the more stupid and backward tribes around them by planting out Mandé families in their midst. These establish schools, gain over the children, get legitimate influence ; disputes are referred to them, and, through them, to headquarters at Kong, the central authority being thus gradually confirmed. One cause of the greater relative success of the Mandé is, he says, that they add commerce to their other resources. The Peul are only cultivators and breeders of cattle, and are thus at the mercy of a failure of crops or of an epidemic. Their colour, too, he says, makes the blacks view them with more distrust. Among many other topics of interest, the writer's remarks on the civilising and elevating effect of Islam, and the singularly tolerant character of its votaries in this part of Africa, deserve attention.

The Country of the Vosges. By Henry W. Wolff. London : Longmans, Green, and Co., 1891. Pp. 368. *Price* 12*s.*

Of the three months that the author walked in the "Wasgau" (the country of the Vosges), during eight weeks together he never heard a word of English spoken. It is thus a new field for English tourists, and the author assures us it is a most picturesque and interesting one. The only trouble seems to be the multitude of officious French and German *gensdarmes* encountered when the tourist crosses the frontier, as he often must do. To possess a notebook or a map is to become at once an object of suspicion and mistrust. The author found the Alsatians loud in their complaints about their new German masters, who have shown far less tact than the French in winning their hearts. The German government of Alsace-Lorraine may be administratively good, but the natives consider that the French system was much more attractive.

Metz is not in the Vosges, but it lies quite near, so the author devotes two chapters to it. Strassburg, also, is fully described, and a wealth of knowledge is shown concerning its culinary delicacies. The author points out to us also what he calls the "Goethe country," where the poet roamed whilst a student at Strassburg.

The remainder of the book is devoted to Alsace and the Vosges, and is throughout most attractively written. It is evidently the work of one who has thoroughly mastered his subject. We note the author's derivation of the term "Ballon,"

applied to various mountains of the Vosges, Black Forest, and Jura (*e.g.* Ballon d'Alsace). He says it has nothing to do with "balloon," but is a French corruption of the German "Belchen," which is cognate with the Celtic "Belstan," a sacrificing-place in pagan days sacred to the sun-god. There is a "Belstane" not far to the west of Edinburgh, near Kirknewton. A map of the Vosges makes this volume complete.

La Transcaucasie et la Péninsule d'Apchéron. Par Calouste S. Gulbenkian. Paris: Librairie Hachette et Cie, 1891. Pp. 336.

This volume is the result of a journey made by the author, in 1890, from Batum to Baku, by the Trans-Caucasian railway. As he never went far from the line of railway, a large part of the information contained in the book is extracted from various authors, British and foreign, or is to be found in geographical publications, but, although not new, it may be fresh to a large class of readers. All that passed under the author's own observation is well described. Kutais, its hot springs and monastery, Tiflis, the wells of Baku, and other places in the peninsula of Apsheron are depicted in the lively and agreeable style of which the French are masters. Incidents of travel, national legends, remarks on dress and customs, historical and other notes fall naturally into their places, and serve to render the narrative more interesting and attractive. Several chapters are devoted to a description of the wells and the processes of extracting and storing petroleum, and tables are given showing the amount obtained annually and monthly. A large quantity of oil is at present lost from want of proper machinery and cisterns large enough to hold the oil when it wells up, as it does from time to time, in enormous volumes.

About Ceylon and Borneo. By Walter J. Clutterbuck, F.R.G.S. London: Longmans, Green, and Co., 1891. Pp. 265. *Price* 10*s.* 6*d.*

The author of this book does not claim to have written, if we may judge by his preface, a very full account of either the places which or the peoples whom he visited. He has rather endeavoured to give an amusing description of some of the incidents that came under his notice. How far he has succeeded in doing this must depend greatly upon the faculty of appreciating such style of writing possessed by each individual reader. He is evidently rather diffident upon the point himself, as he takes the opportunity of reminding us that "every one sees things from a different point of view," and is far from insisting that his own view is the correct one. However, there is some interesting information about a tea-planter's life in Ceylon and the little-known region of North Borneo. Many of the illustrations from photographs are interesting and picturesque.

Bear-Hunting in the White Mountains; or, Alaska and British Columbia Revisited. By H. W. Seton-Karr, F.R.G.S., etc. Illustrations and Map. London: Chapman and Hall, 1891. Pp. 156. *Price* 4*s.* 6*d.*

This is a pleasing little book describing in a series of letters the author's wanderings during the summer of 1890. He hunted bear in Alaska, fished in Adam's Lake in the Shushwap district, and shot bighorn in the Cascade Range. Sport, however, occupies only a comparatively small space, the greater part of the work consisting of descriptions of scenery, notes on the fauna and flora, remarks on the Indians, their manner of life, customs, and occupations, and miscellaneous information on trade, industry, etc. The most interesting part is that which treats of the Chilcat River in Alaska, on which country Mr. Seton-Karr is a well-known authority. On this occasion the traveller ascended the Klaheena River, which he

named the Wellesley, and crossed the divide to the Upper Chilcat, a journey of considerable labour and difficulty. In his introduction Mr. Seton-Karr warmly protests against the free-trade in spirits, which is gradually exterminating the Indians. The map is based on that accompanying Mr. Dawson's narrative in the Report of the Geological Survey of Canada.

United States Pictures, drawn with Pen and Pencil. By Richard Lovett, M.A. London: The Religious Tract Society, 1891. Pp. 223. *Price* 8*s.*

This volume must not be confounded with another of the same series by the late Dr. Manning, entitled *American Pictures.* Mr. Lovett's work deals only with the United States, the letterpress is entirely new and written from personal experience, while out of 157 engravings only five are taken from the older book. We have, on former occasions, favourably noticed the author's contributions to this beautiful set of volumes, and in the present instance can but say that he shows all his former aptitude for the task he has undertaken, resulting in a very interesting, popular, and well-proportioned sketch of the United States. The engravings are excellent in themselves and remarkably well produced, although we are somewhat surprised at the frequency with which architectural subjects have been chosen for illustration. The reason for following such a plan in the treatment of older countries might very easily be understood, but the States have but little of history to make their public buildings objects of interest to Europeans, and thus, we are inclined to think, more attention might have been given to the varied landscapes of the Republic; but the work is a good one, and a real acquisition to the series. There is a clear map and a fairly full index, and, taken all in all, the book will make a useful and handsome gift either for young or old.

Twelve Months in Peru. By E. B. Clark. London: T. Fisher Unwin, 1891. Pp. 158.

The authoress of this attractive volume recounts her experiences in Peru during 1890; so that it is a book up to date. Except for its earthquakes, she found Lima, the capital, a most charming city, and left it for the Sierra with regret. Crossing the stupendous Verrugas Bridge, which spans a chasm 580 feet wide, the railway ascends to Chicla, 12,220 feet above the sea. For this remarkable railway the Peruvians are indebted to North American engineering. Ascending to 16,800 feet, our authoress beheld the grand waterfall of Puy-Puy, which forms one of the sources of the Amazons and descends from a snow-clad peak 19,000 feet high.

Australia Revisited in 1890, *and Excursions in Egypt, Tasmania, and New Zealand: Being Extracts from a Diary of a Trip Round the World, including Original Observations on Colonial Subjects, and Statistical Information on the Pastoral, Agricultural, Horticultural, and Mining Industries of the Colonies.* By Josiah Hughes. London: Simpkin, Marshall, Hamilton, Kent and Co. Bangor: Nixon and Jarvis, 1891. Pp. xvi + 499. *Price* 5*s.*

Mr. Hughes' voluminous title-page, reminding one of the titles of books published last century, sufficiently indicates the nature of the work. The book may be recommended as a guide to intending emigrants, for not only does the author's former experience as a colonist enable him to contrast the past with the present and to forecast the future of Australia—not as the generalisations of a passing visitor, but with the authority of one who speaks of what he really knows—but, also, the volume is well equipped with full statistics from official sources on matters concerning the trade and industries of the Colonies; these, being gathered

in orderly array under their respective headings, are more easily consulted and more likely to be properly understood than if hunted for in numerous Government reports. In fact, the statistical chapters form the best part of the book; for when the author gets upon his travels he is far too personal and egotistic, and full of musty platitudes by way of reflections which, from constant occurrence, are apt to irritate. But, nevertheless, we have to thank Mr. Hughes for an intelligent account of our great Island Continent, and can with confidence recommend its perusal to any one having, or expecting to have, special interest in that part of the World.

At the Antipodes. By G. Verschuur; Translated by Mary Daniels. London: Sampson Low and Co., 1891. Pp. 330. *Price* 7*s.* 6*d.*

A lively and instructive account by a Frenchman of his voyage round the World during 1888-9, sailing from Marseilles *viâ* the Red Sea, Seychelles, Australia, New Caledonia, New Hebrides, Fiji, New Zealand, Montevideo, Rio Janeiro, and Lisbon. M. Verschuur is a most intelligent traveller, and lost no opportunity of investigating each country he traversed. He examined a school of young Australian blacks at Lake Tyers, and found their knowledge of geography was much superior to that of many Parisians. Perhaps his most telling description is that of the French convicts in New Caledonia. He considers that the convict-system there is altogether bad. The convicts are ridiculously well kept, and, being steeped in vice, rarely reform. New Caledonia is a perfect El Dorado for criminals, and the easy life of its convicts bears no resemblance to the severe punishments awarded them by French juries.

M. Verschuur visited the New Hebrides on a Sunday, and wished to buy a native's tomahawk, but the native answered, "Not on Sunday"—the British missionaries having inculcated Sabbath observance. He called on the "Hermit of the New Hebrides," an eccentric Scotsman named McLeod, who has resided there for twenty years, and is reputed to be a millionaire. At one time he was in the kidnapping business, and excited much hostility. Rounding Cape Horn, our author reached Rio de Janeiro, and considered its bay "the very *chef-d'œuvre* of creation," and far superior to Sydney Bay. As to Rio itself, he found it an old and dirty town. Then he visited Montevideo, where he came to the conclusion that in no part of the World had he seen so many charming types of female beauty. Having also visited Buenos Ayres and found it a flourishing cosmopolitan centre, he returned, *viâ* Rio and Lisbon to France, reaching Bordeaux after nearly a year's absence. We can commend his interesting and instructive book to all purposing to make a similar voyage round the World.

With Axe and Rope in the New Zealand Alps. By G. E. Mannering. London: Longmans, 1891. Pp. 139. *Price* 12*s.* 6*d.*

The ascent of Aorangi, more popularly known as Mount Cook, the highest mountain in New Zealand (12,349 feet) has been the despair of mountaineers. The Rev. Mr. Green of Cork went specially from Ireland with Swiss guides in 1882, attempted it, and failed. His well-known book on *The High Alps of New Zealand* describes his expedition. Mr. Green first introduced into New Zealand the proper system of Alpine climbing. Now, Mr. Mannering describes the five attempts he made to climb Aorangi—but only to get within 140 feet of the summit. We can only wish him better luck next time, and express our appreciation of his pluck and skill. The volume before us is very well written, and is illustrated with beautiful photogravures. The surface of snow-field and glacier is represented, by means of photography, in a most realistic manner.

The Modern Odyssey, or Ulysses up to Date. London, Paris, and Melbourne: Cassell and Company, Limited, 1891. Pp. ix + 454.

The anonymous author of this work has presented us with a most lively and entertaining book. He devotes his space principally to a description of the cities he visited in the course of his tour round the World, and to a discriminating study of the characteristics of the people inhabiting the larger centres of population in the United States, Canada, Australia, New Zealand, the Pacific Islands, China, Japan, India, Egypt, etc. His remarks upon town-life in the United States, if severe, are entertaining, showing the discomforts that attend the sacrifice of the convenience of the many to the liberty of the individual, and the unsightliness that arises from the seeming necessity for things to be big or ugly in order to be useful. But his reason for the absence of the "rough" from crowds in this part of the World hardly seems to be satisfactory. Australia seems to have most struck the author as the country where town-life—especially in Sydney—is to be met with in perfection; yet, even here, there are drawbacks, such as election to the legislative body—at least, so we judge from the amusing sketch of a meeting of the Colonial Parliament. The narrative is instructive without being heavy. The calotype illustrations are excellent productions, the printing bold and clear, and the binding effective, though delicate. An index would have been an advantage, but the arrangement of the chapters makes its absence less felt than would otherwise have been the case.

Tell el Hesy (Lachish). By W. M. Flinders Petrie. London: Committee of the Palestine Exploration Fund, 1891.

The Palestine Exploration Fund, after long efforts, finally obtained permission in 1890 from the Turkish Government to explore Umm Lakis, Khurbet Ajlan, and other sites within a limited area round these. The idea was that Umm Lakis and Khurbet Ajlan, from their names, must be the sites of ancient Lachish and Eglon. Beginning excavations at the former place, Mr. Flinders Petrie soon came to the conclusion that it was only a late site and not that of an Amorite city. It might have been a post-exilic town taking name from an older one; and about three miles from it the mound of Tell el Hesy promised better results. This he considers must be the Amorite site of Lakhish, while Tell Nejileh, five miles from Khurbet Ajlan, was that of old Eglon. Mr. Flinders Petrie made a very thorough examination of the Tell el Hesy by careful and extensive excavation; and the minute care with which he registers the site and depth where every sherd of pottery was found, with its character and shape accurately illustrated, affords a splendid model of how work of the kind should always and everywhere be pursued. He classifies the whole from the top of the mound downwards, placing the latest at 450 B.C., and the earliest dwellings, at 62 feet lower level, at 1670 B.C. We should like to see fuller proof than the author gives of the accuracy of his scale of dates, and what might be urged against it by an honest opponent. The chronometric scale may be accepted without quite agreeing to the dates and intervals attached to it. These, however, are made to work very well into the lucid chapter on the history of the place. The pottery and flints are carefully described and figured. The last twelve pages are devoted to a series of short but interesting notes on other sites visited in Southern Palestine in 1890.

This volume is an important addition to the valuable work done under the Palestine Exploration Fund Committee.

Longmans' School Geography for South Africa. By George G. Chisholm, M.A., B.Sc., and Professor James Alex. Liebmann, F.R.G.S., etc. etc. London: Longmans, Green, and Co., 1891. *Price 3s. 6d.*

This book embodies a happy idea, which is capable of considerable extension. That idea is what may be called educational perspective applied to geography, consisting as it does in putting in the foreground and treating on a large scale the countries in which the book is to be used, and in throwing the rest of the World into the background, where the diminishing scale extinguishes the minor features altogether, and lessens the apparent size even of the most important. To an inhabitant of South Africa Cape Town is a more important place than London, and London is a more important place than Berlin, or Calcutta, or New York; for Australians, Sydney and Melbourne, and for Canadians, Montreal and Toronto, occupy a similar position of prominence. The idea is not entirely new, the Canadian geographies of Mr. J. B. Calkin being constructed on the same plan; but we gather from hints in the text of the book under review that its projectors contemplate a wider application of the perspective principle. In illustrating the dimensions of European countries, the Australian as well as the South African Colonies are adopted as standards of comparison. In one place the area of Great Britain is said to be nearly equal to that of Victoria, and in another place to be more than one-third of the size of Cape Colony. Ben Nevis is compared to the highest summits in Australia and New Zealand. Ireland is said to be one-fourth larger than Tasmania, and France more than twice as large as Victoria. The body of the book is therefore adapted for use either in Australia or in South Africa; and the matter is so arranged as to facilitate such adaptations, the geography of South Africa standing at the beginning, and that of Australia and Canada near the end.

Apart from the general design, the method of the book is its most important feature. Mr. Chisholm avows himself a disciple of the German geographers, who in their text-books confine the attention to broad and general features, and exclude rigorously all details which overload, distract, embarrass, and disgust the learners. He aims at making the study of geography a pleasurable and informing intellectual exercise, and not merely a laborious and painful effort of memory. He appeals to the reasoning faculty and to the imagination. He therefore makes free use of diagrams and pictures, and he insists on constant reference being made to the map, to which he regards the text-book as being entirely subordinate.

All this is sound and admirable, and it is soundly and admirably carried out in the portions of the book for which Mr. Chisholm is responsible. He does not seem, however, to have been quite successful in impressing his collaborator, Professor Liebmann, of the University of the Cape of Good Hope, with the value of his excellent principles. It is in some respects an admirable piece of work; but it violates, not occasionally but throughout, the principles laid down by Mr. Chisholm in his preface as essential and vital. It is overloaded with details which the pupils cannot possibly be expected to remember, and which would be of very little benefit from an educational point of view if they could keep them in mind. In connection with Cape Colony, Natal, and their dependencies, not only important towns but also insignificant villages are enumerated, and both in the text and in the footnotes there is a superabundance of information which cannot fail to perplex and embarrass the student.

The introduction contains an excellent outline of mathematical and physical geography, intended primarily for the use of teachers; and too much praise cannot be given to the illustrations, which really illuminate the text.

Physiography, Elementary Course. By the late ANDREW FINDLATER, M.A., LL.D. New Edition by DAVID FORSYTH, M.A., D.Sc. London and Edinburgh: W. and R. Chambers, 1891. Pp. 194. *Price* 2*s.*

Physiography, a Class Book for the Elementary Stage of the Science and Art Department. By J. SPENCER, B.Sc., F.C.S. London: Percival and Co., 1891. Pp. 229. *Price* 2*s.* 6*d.*

These little books will probably enable many students to pass the Science and Art Examination in the Elementary Stage of Physiography, and, since this is their purpose and their apology for existence, detailed criticism as to shortcomings from an undesired ideal are of course out of place. Dr. Forsyth's book is clear and in the main accurate, but appears to us to give an undue proportion of space to matter more in keeping with the subjects of chemistry, heat, electricity, and magnetism. Dr. Murray's theory of atolls (p. 77) is not quite fairly stated, the expression, "the outer edge of the rock may therefore very much overhang its base, and give it the appearance of having grown from very deep water," being misleading. Mr. Spencer only describes Darwin's theory of coral growth. His book, which is in many respects the more original and ambitious of the two, has unfortunately several defective statements. Of these such a definition as (p. 1), "Matter is the name given to any material substance," is a fair example. Both are copiously illustrated with clear woodcuts and serviceable maps.

L'Asie, L'Océanie, L'Afrique. Par MM. P. VIDAL DE LA BLACHE et P. CAMENA D'ALMEIDA. Paris: Armand Colin et Cie. Pp. 500.

This is the second of a series of four volumes which the authors are preparing to interpret the French Educational Syllabus of 1890 for Geography as a subject of secondary education. It is intended to be read in conjunction with the excellent atlas now being published in parts by M. de la Blache, but is supplemented by a set of clear diagrammatic maps printed in the text. The book is written in an agreeable narrative style, and succeeds in being interesting without loss of accuracy. The most pleasant feature of the book is the impartiality with which the influence of the various European governments in Asia and Africa is dealt with. The strictures passed on mistaken policy are just in almost every case. While rightly directing a large share of attention to the notable work of French explorers and colonists in all parts of the globe, a proper amount of space is bestowed in a fair spirit on the achievements of British, Dutch, Portuguese, and German enterprise. Books such as this are required in France, and should assist in forming a healthy public opinion as to the duties and responsibilities of all nations in possessing and improving the Earth.

Fossil Botany: Being an Introduction to Palæophytology from the Standpoint of the Botanist. By Professor SOLMS-LAUBACH; translated by H. E. F. GARNSEY, M.A.; revised by Professor ISAAC BAYLEY BALFOUR, F.R.S., etc.; with 49 illustrations. Oxford: Clarendon Press, 1891. 8vo, pp. 401. *Price* 18*s.*

We gladly welcome this worthy translation of an excellent book. Here, for the first time, the English botanist may read in his own tongue a critical digest of all that is known at present of fossil plants from the point of view of botanical morphology. The work has been carefully revised by Professor Balfour, so that the student may be assured that he has within its pages the very latest information. Although it is strictly confined to the standpoint of the systematist, workers in other departments of fossil botany and geologists generally will find here much to interest and instruct them. The latter, especially, will welcome with pleasure the admirable introduction, which contains an account of the various modes of preservation of plant-remains and the formation of coals. The fossil plants dealt with

by the author are those that are grouped under Thallophytes, Archegoniatæ, and Gymnosperms—the interest of the systematist centring chiefly in the plant-remains that belong to the more remote geological epochs. Those forms whose nearest relatives can be studied in the living state, such as the Angiosperms, are of little value for his purposes. Here, then, botanist and geologist will meet with an admirable account of the leading plant types of Palæozoic times—the conifers, ferns, lepidodendroids, sigillarioids, etc. The work is enriched by a copious bibliography and furnished with a good index, and can be cordially recommended to all who are in any way interested in fossil botany.

The Man of the Past; the Evidence of his Natural Origin and Great Antiquity. By CHARLES C. CATTELL. London: Simpkin and Marshall. N.D. *Price 6d.*

This little work is intended for the instruction of those who cannot spare time to read the numerous and voluminous works on the origin of the human species and the earliest traces of man's existence. Such being its object, the evidence obtained on these subjects should have been clearly arranged under the different sciences—such as Craniology, Physiology, Archæology, etc.—and weak points in the theory of evolution, where additional testimony is desirable, should have been pointed out. We have here, however, quotations from a variety of sources thrown together without any system, the principal subjects even, the origin of man and his antiquity, not being kept distinct. Nevertheless, the most important discoveries being recorded in this pamphlet, the reader may obtain from it some general notion of the subject.

Old Dundee—Ecclesiastical, Burghal, and Social—prior to the Reformation. By ALEXANDER MAXWELL, F.S.A.Scot., Author of *The History of Old Dundee.* Edinburgh: David Douglas. Dundee: William Kidd. 1891.

Mr. Maxwell's *Old Dundee prior to the Reformation* is a sequel as regards time of publication, but a prelude as regards the period dealt with, to his *History of Old Dundee after the Reformation*, published some time ago. Like its precursor, it is an admirable work—a valuable record of the history of an old Scottish burgh, abounding with most interesting details of the ecclesiastical, burghal, and social life of the people of Scotland from the thirteenth to the sixteenth century. The book is divided into two main sections, the first dealing with the pre-Reformation Church in its time of transition; and the second treating of the municipal institutions and the social life of the same eventful period.

The first section opens with a very interesting account of the early history of St. Mary's Church, the principal church in Dundee—of its traditional foundation by David, Earl of Huntingdon, the ancestor of Robert the Bruce, of its connection with Lindores Abbey, and of the dedication of its numerous altars. That is followed by a careful description of its lesser churches, and chapels—St. Clement's, St. Brice's, St. Nicholas's, and others; and that by a minute account of the convents attached to it—the Gray Friars' Monastery, the Black Friars' Monastery, the Red Friars' Monastery, and the Gray Sisters' Nunnery. Then comes an interesting chapter on the early reformers—James Resby, Paul Crawar, and others—and on the persecutions to which many of the inhabitants of old Dundee were subjected for their heroic adherence to the new doctrines; including the execution by hanging and burning of David Straiton in 1534. Another chapter is devoted to the eventful career and final martyrdom of the famous George Wishart, who suffered death by burning in front of Cardinal Beaton's Castle at St. Andrews in 1546, and whose martyrdom is a great landmark in the history of the Reformation in Scotland.

The following year was that of Somerset's invasion, which involved the Scottish

disaster at Pinkie Cleugh, the capture of Broughty Castle, and the bombardment of Dundee by the English army, followed by the recapture of Broughty by the Scots and the expulsion of the English. Mr. Maxwell stoutly, and as we venture to think, successfully supports the claim of Robert Wedderburn, vicar of Dundee, to the honour of having been the author of "The Complaynt of Scotland," a contention in which he is supported by the opinion of David Laing.

An interesting episode of the Reformation struggle was the conflict between the Abbot of Lindores and Thomas Makgibbon, the master of the grammar school of Dundee, in 1555. Makgibbon, who held advanced opinions, was charged with disseminating them among his scholars. The Abbot appointed other teachers to take Makgibbon's place ; but the Town Council, supporting Makgibbon, interdicted the new teachers from receiving scholars, and imposed fines on parents who did not send their children to the grammar school. The conflict, after raging for two or three years, was brought before the Lords of Council, who decided in Makgibbon's favour ; and ultimately before the High Court at Edinburgh, but with what result does not appear.

The second section of the volume, dealing with Burghal and Social Life, possesses more general interest than the first. It opens with a graphic picture of the old burgh,—its site and surroundings, its division into wards, its streets and houses, its herb and flower gardens,—though many of these details will be little understood by those who are not acquainted with the topography of the town. It is disappointing to learn that no records of the ancient burgh exist, so that very little is known of the state of society, and of the system of municipal rule. According to the earliest records extant, the Town Council was a benevolent oligarchy, very partially tempered by a democratic element in the shape of representatives of the craftsmen, whose influence, however, increased during the sixteenth century. It is interesting to find that Hector Boece, a native of Dundee, and the most distinguished of the early historians of Scotland, appeared on one occasion as the probator or counsel of a client in the High Court.

Subsequent chapters deal with the supply of food ; with dress ; with the social position of women—in connection with which there are notices of curious restrictions in the matter of marriage, the consent not only of parents, but even of aunts being indispensable,—with commercial intercourse ; with the position and privileges of craftsmen, and with the condition of the people generally. Here, for example, is an interesting and instructive picture :—

"Those at the head of the table sup their nutritious national kail, or meagre lentrone broth, out of pewter plates with spoons of silver, those at the bottom from 'treen' trenchers, or cogs with horn spoons. The former quaff claret out of valuable cups, and the latter drink ale out of tin stoups. There is yet no mention of knives and forks as part of the furnishings of a house ; but the men usually carry case knives with which they cut their meat, and—the time of forks not yet having come—use their fingers to help. The members of the family have napkins with which to wipe their hands, but those at the bottom of the board, having none, somehow do without."

House rents were low. A mansion with furniture was leased at a rent equal to £27 a year. Shops were leased at £2, 2s., and the best at £2, 14s. a year. A bakehouse was rented at £2, 17s. a year. Ale was largely consumed, many of the houses having all the appliances for home-brewing. Where ale was sold, the quality, as well as the price, was fixed by the magistrates, and in the middle of the sixteenth century it cost from 1s. 9d. to 3s. a gallon.

Even before the dawn of the Reformation, the grammar school of Dundee had acquired, as we have seen, a good reputation. The fee in the lower class was 4s.

(= 12s) a year, and in the upper class, one mark (= 40s). Afterwards, the upper class fee, which went to the head-master, was reduced to 8s. (= 24s.), and the master received in compensation a stipend of £40 (= £120). The course of study included oratory, poetry, grammar, and moral letters, with "gude manners and comlie order"; but there is no mention of geography. For recreation, the people had hawking and hunting, horse-racing, archery, and football, cards and dice, chess and tables, or draughts. It is a sign of the times, however, that with the advance of the Reformation, frivolous diversions were discouraged, and strict order was taken against dicers, card-playing, and night-walkers, who were classed with drunkards, and were subjected to heavy pains and penalties, including banishment.

Mr. Maxwell, it should be said, has done his work extremely well. His book is the result of thorough and honest original research. The author advances nothing for which he has not found warrant in authentic documents. His style is in many places rough and colloquial, but it is characterised by admirable directness and force. The book is furnished with a minute and excellent index.

Alden's Oxford Guide, with Key Plan of the University and City, and numerous Engravings. Oxford: Alden and Co., 1891. Pp. 202. *Price* 1s.

Perhaps the highest testimony to the popularity of this little guide is the fact of its having reached a 17th edition. The information is well arranged for ready reference, and, edited by a local authority, bears evidence of being carefully revised to date. The illustrations are numerous, and a good plan completes its usefulness as a visitor's handbook.

Ireland: East, West, and South, including Dublin and Howth. By C. S. Ward, M.A., Part II. Second Edition—Revised. "Thorough Guide Series." London: Dulau and Co., 1891. Pp. xvi + 216.

This handy pocket volume will be found to fully maintain the reputation that the excellent series to which it belongs has won for utility and clearness. The maps are distinct and accurate, and the routes chosen convenient and well arranged. In the copy before us the index appears to be incomplete, arising, probably, from a mistake made in binding.

Normandy: Its Relics, Castles, Churches, and Footprints of William the Conqueror. By C. B. Black. 4th Edition. London: Adam and Charles Black, 1891. *Price* 2s. 6d.

We have pleasure in welcoming a new edition—the fourth—of Mr. C. B. Black's guide to Normandy. Its great value consists in its being the result of immediate personal contact with the sights and scenes which it describes. The descriptions are both graphic and vivid, and the maps and plans with which it abounds add immensely to the value of the book. It is a special feature of the work that it traces the footprints of William the Conqueror in Normandy—a feature which can scarcely fail to enhance its value in the eyes of English tourists and archæologists.

Brown's Comprehensive Nautical Almanac, Harbour and Dock Guide, and Advertiser, and Daily Tide Tables for 1892. Glasgow: James Brown and Son. Pp. 207. *Price* 1s.

So far as we have tested the various tables and items of general information contained in this volume, it appears to be well adapted for the use of sailors and yachtsmen. The list of lighthouses is full, the sailing directions are clear, although brief, and the article on tidal streams, their direction and rate, very well done. The abstract log, if regularly kept, may also be found useful. The brightly-coloured frontispiece shows the distinguishing flags and funnels of the principal steamship lines.

NEW ATLASES, MAPS AND CHARTS.

THE ENGLISH IMPERIAL ATLAS AND GAZETTEER OF THE WORLD. By J. G. Bartholomew, F.R.S.E., F.R.G.S.

London: T. Nelson & Sons. N.D. *Price* £1. 1*s.*

This atlas contains 108 maps, besides 150 smaller maps, plans, and insets. The British Isles and Empire are exceptionally well represented, and the number of physical maps is very large. Several of the maps are quite new; among these the maps of the United States, New Zealand, and the Indian Archipelago are worthy of special mention. The numerous insets, representing islands, etc., on a scale not often met with, and the plans of towns, are a notable feature of this atlas, whilst the copious index adds considerably to its value as a work of reference.

THE WORLD-WIDE ATLAS OF MODERN GEOGRAPHY. With an Introduction by J. Scott Keltie. Plates 112, and Index 82 pp.

Edinburgh and London: W. & A. K. Johnston, 1892. *Price* 7*s.* 6*d.*

This is a remarkably cheap collection of maps, which should be found useful alike for school-work and the purposes of the general reader. The 112 plates include orographical maps of the continents, and an immense number of small insets showing British Possessions, plans of important towns, etc. Mr. Keltie's introductory matter is of considerable value, being a concise epitome of "Geographical Discovery and Political Territorial Changes in the nineteenth century," or, rather, up to the present year.

THE UNIVERSAL ATLAS, complete in 28 parts, including Index. Published by Cassell and Co., Limited, for the Atlas Publishing Company, Limited. Parts VII., VIII., IX., and X.

Part VII. contains the general map of the British Isles, Denmark, and Alsace-Lorraine with the Palatinates. The two last-mentioned sheets are satisfactory, but the British Isles shows some defects. For instance, the through-line to the North, from Edinburgh to Perth, is partly incomplete and partly incorrectly laid down. The new line from Kinross to Perth has been omitted altogether. No attention has been paid to the important boundary alterations of the counties of Scotland. We still see Ross and Cromarty as separate counties, and the boundaries of Nairn, Elgin, and Banff have not been changed. Part VIII. brings us the constellations of the Northern and Southern Hemispheres, the Solar System, the Moon, Southern Scandinavia, and Norway and Sweden. Part IX. contains the Balkan Peninsula, China proper, and Japan, with the environs of Pekin and Tokio as insets, and a larger map of Japan. Part X. is represented by maps of Russia in Europe, and Asia Minor, with Persia and Palestine. All these maps are clearly and nicely drawn, and are the same as those published in the German edition.

SCHWEIZ, Topographischer Atlas der ——, im Massstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868 durch das eidg. topogr. Bureau gemäss den Directionen von Oberst Siegfried veröffentlicht.

Lieferung xxxix. :—

No. 199. Ruswil.	No. 351bis. Gurnigel.	No. 540. Sessa.
„ 201. Werthenstein.	„ 445. Nyon.	„ 540bis. Agno.
„ 307. Corcelles-le-Jorat.	„ 500. Sankt Niklaus.	„ 541. Lugano.
„ 327. Payerne.	„ 539. Bogno.	„ 542. Ponte Tresa.

L'ANNÉE CARTOGRAPHIQUE : Supplément annuel à toutes les Publications de Géographie et de Cartographie. Dressé et redigé sous la direction de F. Schrader. *Paris: Librairie Hachette et Cie.*

At the end of last year M. Schrader published the first number of this new annual, which is primarily intended to supplement MM. Hachette's new *Atlas de Géographie moderne*. The maps are collected and reduced from various geographical publications, and show the routes of all the latest explorers ;—Rabot, Petrellius and Kihlmann in the Kola Peninsula, Grombtchefsky, Pevtzov, the brothers Grum-Grzhimailo and Bonvalot in Asia, Crampel, Cholet, Fourneau, Zintgraff, Stanley and Johnston in Africa. Two general maps are devoted to the changes of the political boundaries in Africa. A small sketch-map of North America shows the new States of the Union and the area surveyed at the end of 1890 by the United States Geological Survey. In South America the work of the Brazilian and Bolivian Boundary Commission and of the Paranapanema Expedition is mapped out.

GREAT CIRCLE-SAILING CHARTS OF THE NORTH ATLANTIC, SOUTH ATLANTIC, NORTH PACIFIC, SOUTH PACIFIC, AND INDIAN OCEANS

Hydrographic Office, Navy Department, U.S.A., Richardson Clover, Hydrographer.

These sailing charts on the gnomonic projection have already been published in 1887 ; but the present edition, produced by the electrotype process, has been issued for the purpose of making known a very simple method, lately devised by Mr. Gustave Herrle, of measuring distances along great-circles. Each map contains directions and examples for determining and measuring courses, and is squared up by dotted lines at intervals of fifteen minutes, so that any track-line may be transferred, if necessary, to a Mercator chart. Mr. Herrle might make a very useful addition to his charts by laying down the steamer-routes, with the distances in nautical miles, in which our maps and atlases exhibit a great diversity of figures.

EUROPE.

CAUCASE, Carte de la Russie du ——, agricole, minière, routière et commerciale, comprenant les nouvelles voies ferrées en construction ou projectées. Par Victor Thiébaut. *Revue Française, Janvier* 1892.

AFRICA.

DEUTSCH-OSTAFRIKA, Spezialkarte der Mombasa-Kilimandscharo Route in ——. Von Dr. Hans Meyer. Konstruiert und gezeichnet von Dr. B. Hassenstein, Massstab, 1 : 500,000. *Petermann's Mitteilungen*, 1891, *Tafel* 19.

KAMERUN, Standpunkt der Kartographischen Basis von ——. Von H. Habenicht. Massstab, 1 : 1,000,000. *Petermann's Mitteilungen*, 1891, *Tafel* 20.

SOUTH AMERICA.

BRAZIL, Exploração dos Rios Itapetininga e Paranapanema, pelo Engenheiro Theodoro F. Sampaio, 1889. *Rio de Janeiro : Imprensa Nacional.*

This is the first report published by the Commissão Geographica e Geologica da Provincia de São Paulo. It consists of 14 pages of letterpress and 26 maps, giving the topographical results of an expedition sent out to gain information on the navigability of the rivers, agricultural capacity of the country, etc. To São Paulo belongs the credit of being the first Brazilian State to commence a detailed survey.

List of the Possessions, Protectorates, and Spheres of Influence

APPERTAINING TO THE

BRITISH EMPIRE

REVISED BY

Mr J. R. FITZGERALD,

Of the Imperial Institute.

EUROPE.

UNITED KINGDOM OF GREAT BRITAIN AND IRELAND

Bounty Island.
Antipodes Islands.
Auckland Islands.
Macquarie Islands.

Fiji Islands.

Rotumah Island.

Pacific Islands.

Fanning Island.
Christmas Island.
Malden Island.
Starbuck Island.
Tongarewa (Penrhyn) Island.
Manihiki Islands.
Suvaroff Islands.
Union Islands.
Phœnix Islands.
Cook's Islands.
Caroline Island.
Ellice Islands.
Washington Island.
Jarvis Island.
Dudoza Island.
Savage Island.
Royal Company Island.
Ducie Island.
Emerald Island.
Campbell Island.

* These Native States are under these respective governments, in contradistinction to those included below under the separate heading of Native States.

The Edinburgh Geographical Institute

List of the Possessions, Protectorates, and Spheres of Influence

BRITISH EMPIRE

Prepared by
Mr J. R. FITZGERALD,
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EUROPE.
UNITED KINGDOM OF GREAT BRITAIN AND IRELAND
Isle of Man
Channel Islands
Gibraltar
Malta, Gozo, and Comino

ASIA.
INDIAN EMPIRE.
Bengal and Native States.*
N.W. Provinces and Oudh and Native States.*
Punjab and Native States.*
Assam
Ajmere and Mhairwara.
Madras and Native States.*
Laccadive Islands
Bombay and Native States.*
Sind, Aden Prov. Hom & Native States
Berar
Coorg
Lower Burma
Upper Burma
British Baluchistan
Andaman and Nicobar Islands
Native States.
Kelantan Agency
Central India Agency
Jeypore
Hyderabad
Mysore
Kolapur
Kashmir
Manipur
Tehri-Garhwal & Kumaon
Sikkim
Khasi States
Baluchistan Agency
Chhattisgarh Feudatories
Aden
Perim
Socotra
Kuria Muria Islands
Ceylon
Maldive Is.
Bahrein Islands
Kuwait Principality
Cyprus
British Settlements
Labuan (Island)
Kuching (District)
Malay Protectorates
Perak, Selangor, Sungei Ujong, Jelebu, and Negri Sembilan
Johore and Pahang
The Straits Settlements
North Borneo
Brunei
Sarawak
Labuan
Kuria Muria Islands with Sovereignty
Hong Kong

AFRICA.
Gambia
Sierra Leone
Gold Coast
Lagos
Niger Protectorate
Oil Rivers Protectorate
British East Africa
British Central Africa
Zanzibar
Cape Colony
Basutoland
Bechuanaland
Zambesia and Nyassaland
Natal
Zululand
Mauritius
Rodrigues and Farquhar Islands
Seychelles
Amirante Islands
Diego-Garcia Islands
Ascension
St. Helena
Tristan da Cunha, Inaccessible, and Nightingale Islands

AMERICA.
Dominion of Canada
Ontario
Quebec
Nova Scotia
New Brunswick
Prince Edward Island
Manitoba
British Columbia
Keewatin
Athabasca
Assiniboia
Alberta
Saskatchewan
Territory of the Yukon
Hudson's Bay Territory
Rupert's Land
North-Western Territory
Newfoundland
Bermuda
British Honduras
Bahamas
Jamaica
Turk's and Caicos Islands
Leeward Islands
Trinidad and Tobago
Windward Islands
Barbados
Grenada
St. Lucia
St. Vincent
Tobago
Trinidad
Falkland Islands
South Georgia
British Antarctic Territory

AUSTRALASIA.
New South Wales
Lord Howe Island
Norfolk Island
Victoria
Queensland
Moreton Bay Islands
South Australia
Northern Territory
Western Australia
Tasmania
New Zealand
Chatham Islands
Auckland Islands
Campbell Island
Antipodes Islands
Bounty Islands
Kermadec Islands
Fiji Islands
Rotuma Island
Penrhyn Island
Savage Island
Niue Island
Cook Islands
Manihiki Island
Rakahanga Island
Penrhyn (Tongareva) Island
Pukapuka Islands
Nassau Island
Suwarrow Islands
Danger Islands
Palmerston Islands
Hervey Islands
Rarotonga Island
Aitutaki Island
Mangaia Island
Austral Islands
Rapa Island
Tubuai Islands
Raivavai Island
Easter Island
Savage Island
Hunter Islands
Swain Island
Starbuck Island
Caroline Island
Vostok Island
Flint Island
Malden Island
Penrhyn Island
Sydney Island

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

A JOURNEY IN INDO-CHINA.

By Lord Lamington.

(*Read at Meetings of the Society, Edinburgh and Glasgow, December* 1891.)

I made my first acquaintance with Siam and the Siamese at Bangkok, the capital, where the cordiality shown me by the king and his ministers was an agreeable introduction to my journey in the interior. After a fortnight's stay I started on my way up-country. On arrival at Chieng Mai, the capital of the Laos country, after a three weeks' journey by boat up the Me Ping river, which Mr. Holt Hallett has so admirably surveyed, I was just in time to accompany Mr. Archer, our Consul at Chieng Mai, on his way to Muang Tuen in the Shan States, where he was to take charge of an expedition coming from Burma, appointed to inquire into and survey the frontiers between the Shan States and Siam. I had only a few days in which to find transport and to make arrangements. Stores I had brought with me from Bangkok. My pack-animals were mules owned by Hös or Panthays; these are Chinamen who were driven out of Yunnan for rebellion some few years ago, and have for the most part settled in Burma, carrying on trade in the dry season by caravan. I was fortunate enough to find a party having only ten mules, a sufficient number for my requirements; twenty-five mules being the least number they usually venture to travel with. A Siamese commissioner had to be appointed, and the authorities had some difficulty in doing this, as it is not a favourite post. The pay drawn is very small, and if all the proceedings are not carried out to the satisfaction of the Government, the consequences are probably unpleasant. After divers delays, we started on Dec. 10th, making only a short march the first day. The first two days we travelled through level country, occasionally cultivated, but capable of great development if the jungle were cleared. We then

ascended the right bank of the Me Ping along a narrow and precipitous path. The scenery was lovely, the water rushed along hemmed in between steep hills clothed with palms, plantains, tall forest trees, and all the wonderful luxuriance of tropical vegetation. Before reaching the approximate frontier the most prominent feature is Doi Chieng Dow, a mountain which rises to the west out of the plain, showing to the north a precipitous face thousands of feet in height. The village of Chieng Dow is palisaded, and is the place whither witches are banished.

As we travelled north the people were more clothed and dirtier. The country was covered with jungle, which became much less dense where there were teak forests. The villages, very small and rare, were almost hidden in the jungle. A narrow pass, strewn with boulders and with precipitous rocks on the right hand, took us up to the watershed between the Me Ping and Salwin water-systems. All along the route, wherever there had been some former encampment, were traces of little shrines or plaited bamboo devices to keep off the devils. We found the village of Pong Pa Chem and others beyond the frontier quite deserted owing to recent political disturbances.

In consequence of constant raids and the submission of the weaker state to the stronger neighbour, it is difficult to determine now the proper frontier. Our approach, when about two miles from Muang Tuen, was marked by the coming of the mother of the Governor to greet us, accompanied by a retinue of brilliantly dressed attendants.

Three days' march brought us to Muang Sat, where the party was joined by a commissioner from Chieng Tong; he complained bitterly of his fate, both on account of his age, and also through fear lest he should do anything to displease his chief, who is not renowned for an amiable temper.

Muang Sat is a very small village with a decent market for yams, plantains, pork, and native medicines. The plain of the same name is very extensive, but not nearly fully cultivated. The Me Kok, a fine river some 60 yards broad, flows on the eastern side of the plain.

Our further route lay down the opposite or left bank, but the crossing took some time, as, what with elephants, mules, and bullocks, our party was large, and there were only two small canoes available to transport the baggage.

From Na Mon, a small village which we left on January 2d, until our arrival at Ban Me Chan on January 26th, the main body of the expedition never passed a single inhabited dwelling. The antagonism of interests for the last decade had made the neighbourhood by no means safe. The out-post villages on either side were inhabited by men whom a sense of constant danger had made somewhat oblivious of the rights of property. There was consequently nothing but an ill-defined foot-track, and even this had been unused for a year after the burning of the Muang Yôn and Viang Ché villages by the Siamese last year. We had therefore to cut, and in a good many places to dig, our own road for not far short of a hundred miles in all, extending on either side of Viang Ché. This resulted in a very serious loss of time, but as a compensation it induced the former inhabitants of the destroyed villages

to return and rebuild their old houses, so that the line is now likely to be kept open. From a distance of about twelve miles below the town of Muang That, as far as Ta Tôn, the Nam Kôk runs in a narrow channel between hills, and the stream is rendered quite unnavigable by constant rapids, of which the chief is Chieng Sö Wyen. This is the point at which the Siamese claim that their frontier crosses the Nam Kôk.

Phya Pap, a celebrated rebel against Chieng Mai, was the immediate cause of the destruction of the Viang Ché group of villages. After the failure of his projected rising at Chieng Mai, he proceeded to Chieng Tong, where, attracting to himself some of the floating bad characters who are scattered about the Shan States, he marched south and occupied Muang Fang. The chief of Muang Fang was himself engaged on a questionable enterprise against a State whose destiny, whether to be under our protection or that of Siam, had not been decided; but he quickly returned to his capital, and driving out Phya Pap, pursued him across the Me Kok, and, on the ground that the Shan villages on the north bank had given assistance to the rebel, burnt them. Hence the general devastation.

Viang Ché, to judge by the great double ditch that surrounds the site, must have once been a large town. Now impassable jungle reigns everywhere supreme. The number of tigers is therefore very great, and until we left the Nam Kôk there were alarms in the mule and bullock camps every night, and sometimes several times in the same night. No mules were taken, but several bullocks were carried off. The density of the jungle secured the safety of the tigers. From Muang Nyam the roads lead gradually up to the Kyn Hki Tai range, which divides into two ridges, the higher of which is 2750 feet above the sea-level. The ascent and descent are very gradual, and the road under ordinary circumstances, and with regular traffic, would be very easy. It had, however, been almost totally disused for many months, with the result that we marched mostly along stream-beds, and by paths cleared for us by working parties through interminable stretches of gigantic bamboo. After getting clear of the Me San Noi, we entered the western fringe of the great Chieng Sen plain; but, although there were abundant signs of former cultivation, no inhabitants were met with until we reached the Lao village round about Ban Me Chan. Just under the hills at Pung Peu there are hot springs. There is a considerable deposit of sulphur, and the air was heavy with the smell of sulphuretted hydrogen. The water bubbled out from fissures in the rock, and in at least one place spurted out in a spray to a distance of two feet. We had no apparatus for testing the temperature, but it seemed to be very close on boiling-point, and in the early morning heavy masses of steam rose from the marsh formed below the springs. A still more singular circumstance was the existence of similar springs of hot water in the bed of the Me San, which flows a short distance to the south.

The village of Ban Me Chan marks the commencement of the plain of Chieng Sen, a tract of country some thirty miles long, with an average breadth of twenty miles. It would be very productive if there were a population in proportion to its size. The distant prospect was an

agreeable change after the confined range of view in the wooded mountains, and gave a feeling of relief to the eyes.

After three or four days easy travelling, to Honglük, we were once again in the Shan country. The ownership of the plain of Chieng Sen was the principal point of inquiry for the Commission; from the want of any strong natural feature, and from the northerly advance of the Siamese in recent years, it will be hard to define the boundary.

Our route lay under the abrupt precipitous ridge which marks the western boundary of Chieng Sen. Chieng Tong villages have crept down under this range and are stationed on the upper waters of nearly all the rivers here as far down as the Me San. Close to the source of the Me Htain, which flows out of a cavern at the foot of a sheer cliff, are two fine caves, high up in the face of the precipice; inside both are shrines, pagodas, and images, which seem nowadays to attract few worshippers.

As I wanted to enter Tonkin through the Sipsong Pana, a route by which no European had hitherto travelled, and time was getting short, I with great regret had here to bid farewell to my friends of the Commission and go on alone. This was by no means agreeable to my mulemen, who disliked going into a new country, and were still more afraid of having to return alone. However, extra pay tempted them, and in three days, leaving Honglük on February 1st, we reached Chieng Lap, passing through a succession of small plains.

On the way to Chieng Lap we passed by Muang Lin, 21½ miles distant from Honglük, on the north side of the stream named after it, and in the centre of a very fine plain. It was the largest and most flourishing place I had seen in the Shan States.

At Palao the country was quite park-like, but here my little party of eight men were first alarmed at the reports of dacoits. Near to this place I saw some women of the Kha Kaw tribe. They are of very low stature and were extremely shy, bolting into the jungle if one looked at them. Their dress was dark blue—a jacket and a head-dress covered with beads, and shells. They carried their loads on a little yoke supported by a band around the forehead. The lower part of their dress exactly resembled a kilt, having plaits and two lappets hanging in front that answered to the sporran. Most of them also wore leggings.

It was a little below Chieng Lap that Garnier, in ascending the Me Kong, had to forsake his boats, and continue his journey by land along the right bank. Even here, some 1500 miles from its mouth, the Me Kong is a noble river. The natural bed would be about 600 yards wide, but where I crossed it was not more than 80 to 100 yards, very deep, and flowing between jagged rocks that protruded out of the sandy channel. A raft was fashioned out of two canoes and a bamboo platform to ferry over myself and my belongings. This was not done, however, before some tapers had been burnt to propitiate the devils, and a sacrifice of rice, nuts, and a rupee offered up on the rocks. I was unaware of the ceremony till it was too late to see it. The eastern or left bank of the river is Chieng Kheng territory. We had to descend it for some six miles, marching over the burning sands of the broad river-bed.

Here the Nam Ma flows in, and during the rains its current is so violent and the volume of water so great, that the passage of the Me Kong has to be made below the mouth of the Nam Ma. On a high bank, in the angle formed by the bend of the Me Kong, is the site of the ancient city of Viang Kŏk. As usual, the neighbouring population could give no sort of idea as to when this city ceased to exist. The ramp and the moat can still be traced, though choked with jungle, and the place must have been of considerable size, and, commanding as it does two reaches of the river from the one front, must have been of some strength. The Chieng Lap village which existed here has not been resettled by the Muang Sing people, no doubt because it would require to be able to protect itself, and the old cleared lands in the neighbourhood are not sufficiently extensive to support more than a hamlet. Indeed, the whole country from here to the immediate neighbourhood of Muang Long is deserted, and the land itself is so nearly flat, with only very gentle undulations, that practically the whole area could be brought under cultivation by irrigation from the Nam Ma, the Nam Oo, and the Nam An. Muang Long lies in a flat valley, or rather a strath, along the banks of the Nam Ma. It is the beginning of the long plain, as it might almost be called, which runs up to Muang Sing, and past it on to Muang Phong in Chieng Hong territory. It varies in width from a mile or two at Muang Long, Muang Kang, and Muang Nang, to five or six at Muang Sing, and eight to ten at Muang Phong. Each of these townships is separated from its neighbours by gently sloping ridges of from 100 to 200 feet high, covered with dense forest, but otherwise the plain is unbroken, and the existing clearing for paddy cultivation might be enormously extended without any other labour than that of cutting down the jungle. To the west a high range, growing steadily higher northwards, separates the strip of plain land from the Me Kong, and to the east hills, range behind range, tower up to heights of 6000 or 7000 feet, shutting off the Siamese country beyond so completely, that there is absolutely no communication except by toilsome forest-tracks from one village to another.

Fire was raging over the pampas, roaring and devouring the trees and all other vegetation. I had to be cautious in approaching Muang Sing, the capital of Chieng Kheng, as the Sawbwa, who is by rights a vassal of Chieng Tong, had been annoyed at not obtaining the latter state for himself instead of his nephew, and had placed himself under the protection of Nan, a Siamese State. Chieng Tong being tributary to us since the Burmese war, I did not know how far his animosity might extend. Whilst I sent on emissaries to ask for camping ground, a shouting and yelling crowd of men, dressed in black, engaged in dragging timber, spying a curious object, dashed towards me. However, they were most peaceful, and delighted at examining any of my possessions. During the whole of my stay at Muang Sing they followed me about like a tribe of children filled with wondrous delight. I learnt they were Khas, brought down from the hills to build a new palace for the Sawbwa. They have no religion, and for food were given a daily allowance of dogs from the neighbouring villages. All was arranged amicably with the Sawbwa,

and my camp was pitched near the market to the east of the town. I paid a visit to the chief, a kind, portly old gentleman, who conducted me to some cushions across the uneven and springy bamboo floor. All his ministers were assembled, and a motley set they looked, the Mongolian type being very predominant. Whilst the interpreters were at work the contrast of the soft sounds of the Burmese with the harsh tones of the Shan language was very noticeable.

The gradual re-settlement of the trans-Me Kong country drew the capital eastwards to the ancient town of Chieng Kheng, on the left bank of the Me Kong, and from there, the present Myoza, on his accession, moved still further eastwards to Muang Phong, no doubt as a precautionary measure against possible attacks from Chieng Tong. Except rice, cotton, and opium, and a small amount of tea, which is more and more cultivated as one goes north till the tea gardens of Ibang are reached, there is no produce of any value in the State, suger-cane and tobacco being only grown for personal consumption. The arable land is, however, vastly in excess of that actually under cultivation, and the State should be very rich. Though the capital was shifted to this side of the Me Kong only seven years ago, it already numbers 2000 inhabitants.

In my opinion, Muang Sing has a future before it, and the plain, though not nearly of the same extent as that of Chieng Sen, has yet a most promising appearance. I trust that the chief of Chieng Kheng will once more return, as I believe he is anxious to do, to his proper allegiance. The position of Chieng Kheng on the trade route from the trans-Me Kong States of Chieng Hong to Northern Siam makes it a trading-station of some importance; and the natural development of trade, and improvement of communications in these regions, must all tend to enhance the value of Muang Sing as a future commercial centre. The climate also is far cooler and more invigorating than that of Siam; while the scenery is less tropical, the jungle giving way gradually to the fertile open plains peculiar to the Shan States. The people also are a taller and stronger race, approaching to the Yunnanese type.

The difficulty of obtaining here definite information as to the route to the Nam Tay or Black River was great. Very few people knew the country even as far as the watershed between the Me Kong and Nam Oo, and of these all differed as to the practicability of the route. My object was, if possible, to find a road to the Black River without having to go to Muang Sai in the south, or by way of Chieng Hong in the north. The latter I knew to be Mr. Archer's intended route, and I therefore wished to cover other ground. My start took me in a northerly direction to the extreme end of the plain, on which several villages were scattered about on either hand.

Our first march was not a long one, and to no purpose, as during the night dacoits stole some mules, and, pursuit being impossible in the dark jungle, we returned to Muang Sing on the following day. Having been delayed two days I crossed the low watershed between the Nam Sing and the Nam Mang, which flows into the Nam La (?), and then the path lay through a narrow valley gradually opening out into the small but well cultivated plain of Muang Mang. A good many opium caravans pass through here; for the poppy cultivation, which commences about

this latitude, is extensive to the north and west, and the produce is thence taken southward and bartered chiefly for cotton.

Some little distance after quitting Muang Mang, the march or boundary between Chieng Kheng and Muang Phong is reached, and is marked by a low mud wall with a bamboo palisade on the top. Walking is extremely easy, as the road leads through the extensive plain of Muang Phong. A high mountain of sugar-loaf form rises to the north-east, called Loi Cham Lem, and rather more to the east another, with a sharp double top, Phu Chu Phu Cha. They are a great distance off, and overtop all the other mountains, but after leaving Muang Phong I never saw them again. Muang Phong is one of the twelve states of the Sipsong Pana, of which Chieng Hong is the chief, and to the Sawbwa of which the rest pay their taxes. The Sipsong Pana is held to be the richest and most fertile region in the north of Indo-China. The western bank of the Me Kong may perhaps offer superior advantages for a railway, but at all events there would be no obstacle, beyond the Me Kong at Chieng Lap, to the prolongation of the Burma-Siam railway, as advocated by Mr. Holt Hallett and others, along the route I had come; and the general appearance of the country would warrant the belief that it could be easily continued from Muang Phong to Chieng Hong. This is one of my reasons for hoping the Indian Government will accept the suzerainty over Chieng Kheng, which, as I have already stated, is naturally tributary to Chieng Tong, one of our protected states.

At the request of the Sawbwa of Muang Phong, I made a longer stay than I had intended. We interchanged visits, and he showed a childish delight at the most commonplace objects. He was supposed to be bad-tempered and proud, but he must have reserved these qualities for his own subjects. For state occasions he has golden umbrellas, silvered harness, pikes, and tridents; and the herald in front blows blasts on a long trumpet with a round conch-like shell. He was most anxious that I should make my journey to Muang La as rapidly as possible, owing to the chances of dacoits being about. These are said to be refugees from our war in Burma, or followers of the Minghoon prince, who escaped from our custody and has ever since been intriguing and causing disaffection in Burma and the Shan States.

Iron is found in the State. The houses situated in the plain numbered about 400. The further route lay up the Nam La, a picturesque river, but enclosed in a deep valley and with no human habitations. The track I went by must have been of considerable age, as occasionally it was worn so deep into the soft rock that my mules could not pass with their packs on. Muang La, another town of the Sipsong Pana, did not strike one as of great importance, nor was I greeted with the warmth usually shown me. The difficulty was to determine who was chief; I finally made out there were three, so I paid most attention to the eldest, whom I likewise doctored. A funeral took place whilst I was here: the body, accompanied by women wailing and shrieking, was carried in a white shroud to the jungle, where it would be left for two or three days and then buried.

Some tremendous thunderstorms burst about this time, making

travelling very hard work. In spite of the vexatious delay it was ludicrous to see us toiling with feet and hands up a steep greasy path in the jungle, often slipping back till arrested by a tree. The route I took had been in a northerly direction from Muang Sing to Muang Phong, thence to Muang La it changed to the east, and from Muang La to Muang Sai, generally speaking, it might be said to be south-easterly. After Muang La I had gradually to abandon my idea of finding any way into the Nam Oo valley, except by Muang Sai. At no great distance from here stood four pillars on a hill called Doi Lak Khan, to mark the meeting of the frontiers of the old kingdoms of Burma, Siam, Annam, and China. The road to Ban Chom, a town in the Chieng Hai district, lay up the valley of Nam Ngaw.

Usually the villages are almost hidden in the jungle, or grouped together at one corner of a paddy field, so that Baw Hay, built on a rocky knoll, by contrast reminded one of an Italian village. "Baw" signifies "well," and I went to visit the salt wells near the stream. I only did this after strenuous opposition on the part of the headman of the village, as the people are in great fear of the spirit which is said to preside over the well, and they never approach it in white or red garments. The mines are a collection of little huts, having pits into which the brine taken from a well is put; then it is boiled and the salt moulded into bricks, the dimensions of which are $9'' \times 5'' \times 2''$, which cost two annas a-piece. Salt obtained from wells is one of the chief articles of trade, and the Panthay caravans having brought opium in exchange take it away on their return westerly journey. Cotton also they obtain from the natives. This is the wild cotton collected by the hill tribes, which the Panthays, establishing themselves in some centre, go about purchasing from the different villages till they have obtained the amount they require. From Yunnan they bring raw silk, silk jackets, hats, shoes, and walnuts; on the return journey they load-up with cotton and woollen goods from Moulmein. Very picturesque are these caravans. The first notice of their approach is given by the gong sounding through the jungle to encourage the mules. The leading mule is usually decorated with a highly ornamented headgear leaving spaces only for the eyes; foxes' brushes, peacock's or pheasant's feathers wave about on the top, little flags project from the sides, and small mirrors and beads are intermingled with the silver trappings. There is a man in charge of each set of five mules. For defence they carry old muzzle-loaders, dahs, or a great trident some seven or eight feet long.

Here the hill tribes are mostly Yao Yin. They have the neatest and most intelligent appearance of all the hill-people, and bear a closer resemblance than any other to the Yunnanese, whose language most of them understand. The women have a light complexion, and wear a very becoming costume—a loose kind of Turkish trousers of very finely embroidered silk, a long loose coat, and numerous silver ornaments. On occasions of ceremony they wear an extraordinary head-dress of red cloth stretched over a stand about six inches off the head, and about two feet long and one broad.

At some other salt mines called Baw Luang Lun the valley was more

free from jungle than usual, and had a pleasant green park-like look, whilst the air was fragrant with the *pommelo* blossom. A short distance beyond this village the path crossed a low watershed between the drainage-area of the Nam La and that of the Nam Ta, both of which flow into the Me Kong. Pine-trees were growing here, and I noticed now, and on other occasions, that pines did not necessarily betoken a higher altitude, but were often growing at a lower elevation than the ordinary jungle. There were two rather high ascents of about 2900 feet to be made whilst crossing the head-waters of the Nam Ta; the names of these hills were Doi Ta Pi and Doi Mon Katui. The jungle was continuous and good camping-ground entirely wanting.

After crossing Doi Mon Katui there is a small village, the people of which are Thai Dams and come from the Muang Theng region. Their houses were dirty, and, unlike those of the Shans, the floors were not raised above the ground. The women wear the regular Muong attire—a long black upper garment cut away at the sides, and dark blue trousers. Their hair is parted for two or three inches, with a transverse parting close to the head. The men have black turbans and long black overcoats and trousers.

At Ban Bunyon the people are Kamoos. The women's petticoats, instead of being horizontally striped their whole length, have broad red, white, and blue stripes in the lower part of the front.

The information as to the road became more confusing, and, after losing time and temper by following for some distance a path impracticable even for loaded coolies, it became certain that the only possible way was by Muang Sai, the one route I had hoped to avoid. From here there is a path to the east leading to lead and iron mines, but pack animals are unable to go. Caravans of female coolies, attended by one or two male protectors, seemed to be the fashion hereabouts. They were extremely shy, and if they had sufficient notice of our approach would bolt into the jungle. We had now to cross the watershed between the Nam Ta and the Nam Koh, whose waters flow into the Nam Oo. The watershed is 3600. feet, the ordinary elevation of the valleys being about 2000 feet.

Ban Konoi is a prettily situated village on the banks of the Nam Koh, the immediate surroundings giving it the appearance of a large orchard. The road on from here to Muang Sai was a pleasant afternoon's march.

Muang Sai, a trade-centre, and a town of Luang Prabang, is on the right bank of the Nam Koh, and, owing to the thickness of the jungle, it only comes in view when one arrives immediately in front of it on the opposite bank. It is usually here that the Panthay caravans load-up with cotton. The people are Laos, dressed like Shans, excepting that they kept their hair cropped around the sides of the head in old Laos fashion, though even then some of them wore turbans.

There are two prominent kinds of Laos, the western and eastern. The former are called black-bellied, from their being tattooed from the waist to the knee. But as this style of ornament is coming into fashion with the eastern, or white-bellied, Laos, the distinction between the two is vanishing.

We had taken twelve days from Muang Sing to Muang Sai. From here the path ran in a northerly direction to Muang La, which I reached in one day, leaving Muang Sai on February 23d. Muang La charmed me more than any place I had been to. Instead of the usually scattered houses with compounds, there was quite a little street, reminding one of a Swiss village. The town is on the right bank of the Nam Pak, which we forded to camp on the further bank; by mistake we took up our quarters at first in the cemetery. There was a bridge (only of use in the dry weather); it was made of bamboo caissons, filled with stones, and planks laid from the one to the other. On the left bank were salt works kept in the neatest order. The land by the river was banked up with stones to form broad terraces covered with light earthy soil. This is taken away in the morning, having become impregnated with salt. It is then boiled in split bamboos over a fire burning in a long earthen trough. It was a great change to see a place with the people so busy. They were cheerful and extremely pleasant to talk to.

There was no path by the river practicable for mules, and I did not venture to let them leave me and go on by water, as I should require them later on. Consequently, we had to take a path along the mountains on the left bank of the Nam Pak, and one which, as far as I could learn, had never before been used by pack animals. It was far the hardest travelling I had done. We took three days from Muang La to where we rejoined the Nam Pak. The greatest altitude we went up was 4000 feet. Some of the ascents were almost impossible for loaded animals; and the narrowest of tracks on precipitous slopes, often blocked by fallen timber, made our progress slow, though I had eight natives cutting a way.

We were on the paths of the nomadic hill tribes, who just clear the jungle here and there to grow paddy, and therefore this was almost the first opportunity I had of getting a distant view. A feeling of awe came over me when there was nothing to be seen but a crowd of jungle-covered hills; and after passing one of those clearings the dense impenetrable shade of the forest seemed intense. The hill villages were miserable places, with nothing to offer or sell. But Ban Ma, situated in a valley, was inhabited by some of the Thai Dam from Muang Theng, whom I have before described. They were very well-to-do. The three head men came to do homage, prostrating themselves three times, and also made me offerings of rice and eggs. The women, hearing I wished for some of their home-spun petticoats, brought a great variety to choose from.

I saw evidence of other European influence in the shape of a French ten-centime piece on the neck of a child. All through the country I had been passing the only coinage that is current is Indian silver, or, in the market, lumps of silver in the shape of a half-globe and of the diameter of a rupee, having pieces chiselled out of them according to the value of the articles purchased. From this village we went east, following the Nam Ma and Nam Noi. Then our difficulties began again; the valley contracts, and the ribs of rock project into the river. I was assured by the natives that one place was impracticable, and it was only after cutting the jungle for a quarter of a mile on the steep opposite bank that the party managed to get on. At length we again reached the Nam Pak,

and camped on the right bank at Na Sien. I was told there was no further road for mules, but I determined on putting the loads on a raft, and allowing the animals to get along as best they could. My muleteers were in despair: for many days they had been imploring to be allowed to be off their bargain and to return, and they said they were now worn out and could not face further difficulties. I was inclined to let them off, as a boatman said he could take me all the way by water to Muang Theng. Fortunately for me I hardened my heart, and determined on keeping to the mules, as there would not have been nearly enough water in the Nam Ngoa to carry out this plan.

The next day saw three of the party in a canoe, the baggage and one of the interpreters on a raft; and the rest had to scramble with the mules along the banks. The boatmen handled the canoe very skilfully, and it was pleasant, after the hard travelling, to lie down, with the occasional excitement of getting splashed when shooting a rapid. The raft came to grief, and only arrived at the camp long after sunset, having accomplished the latter end of the journey by the light of my solitary bull's-eye lantern. We passed some young *poungees* or priests in a canoe, decorated with little tricolour flags, having "Vive la France" on them. When I reached the Nam Oo, there was a large tricolour flying on a boat, which had lately brought up two Frenchmen from Luang Prabang. They had gone to Muang Sai, so I had missed them whilst coming along the hill road. I subsequently learnt they were Messrs. Macey and Massy, who were going into the Sipsong Pana with the view of opening up trade. The Nam Oo, one of the largest affluents of the Me Kong, was some forty yards broad, some five feet deep, with a current of about two and a half miles an hour. The mules swam the river, and proceeded down the left bank as the road to Muang Theng branches off at Sop Hat, some nine miles further down. Sop Hat is a Siamese guard-house. The road followed a range of hills, with water at only rare intervals, and I, not fully understanding this, started rather late, with the result that night came on and we had no water. The Hös refused to proceed in the dark, and in a spirit of general discomfort we had to go supperless to bed.

The next morning from a hill-top a splendid panorama displayed itself; the mist in the valleys had the appearance of a ruffled billowy sea, but motionless, studded with islands fringed to the water's edge with lovely vegetation. Even my Chinese interpreter admired the beauty of the scene. Sop Nao is the most eastern Siamese post before reaching the first French station. It is a well-to-do village, and laid out with considerable neatness. The path as far as the French frontier was thickly overgrown, and necessitated a great deal of cutting, as what little trade exists is carried on by river.

At times the fallen timber could not be circumvented, and was so large that ramps had to be constructed, by which the mules could get over. The watershed forming the frontier has an elevation of 4400 feet, with a very steep descent, of which my interpreter took advantage by sliding down on a plantain leaf, though it brought him ultimate discomfiture.

The next morning we passed through a fine grassy plain previous to

arriving at the Nam Ngoa. Some large deer darted away at our approach, and wild cattle were seen not far off. At length, after wallowing in deep muddy holes, we traversed the Muang Theng or Dien Bien Phu plain, which, though there had been but little rain, was partially under water.

By 9.30 A.M. on March 4th I heard the French bugle, and crossed the embankment surrounding the fort. Captain Leger, of the Infanterie de la Marine, came to greet me, and I was soon comfortably lodged in a bamboo house, also—what was more to the purpose—had a good meal. There are only a few native houses near to the fort, Muang Theng village being five miles away. The fort is situated in the middle of the plain, which is about fifteen kilomètres long from north to south, and about six or seven broad. The Nam Houm flows close outside the parapet, and has its banks smothered with sweet roses. During the rains the whole country is inundated, and, even when I was there, Captain Leger said I should only have to remain a few days to get fever. There were two European non-commissioned officers besides himself, the troops being tirailleurs or Annamites.

After spending two nights at Muang Theng, I left for Lai Chau, or Muang Lai, as it is called by the Siamese. The travelling now was very different from what we had experienced; the whole way to Lai Chau the path, with the exception of a few rocky places, was kept in good repair; the rivers and streams had bamboo bridges of sufficient strength to bear laden animals.

At the village of Na Theng, two hours from the fort, the road to Son La branches off. Silkworms are bred here; but the village struck me as miserably poor. No doubt the plain has once been populated, but constant warfare has driven away and impoverished the people. The Thai Dam are the inhabitants of the valleys in the whole country east of Luang Prabang as far as the delta of Tonkin and the coast-line of Annam. Their language is very similar to that of the Laos, but the writing differs to some extent. They are certainly the same race as the Laos, but are whiter, or rather yellower, and wear their hair long and tied up in a turban, while their expression and costume show their connection and frequent intercourse with Annamites. Also, unlike the Laos, they bury their dead and burn only the belongings. Their graveyards are very curious. A long pole, with a sort of umbrella on the top, is stuck into the side of the hill, and a number of smaller ones are fixed into it at a slight angle from the perpendicular, each with a small flag. On one side these represent the dead men of the village, and on the other the women, a new stick being added for each decease. On a separate pole are placed the clothes of the deceased. Provisions were double the price we had paid in the Shan States, and neither plantains nor *goor* (coarse sugar) were obtainable. On leaving the plain, the altitude of which is 1800 feet, we crossed the watershed (2700 feet) into the valley of the Nam Pun.

After the junction of the Nam Mun the road took us up the valley of the latter stream, which is very charming with its deep rocky pools. But we had one most unexpected climb. The watershed leading

over into the Nam Tay or Black River, instead of being 1000 feet, as I had been led to expect, above the valley, was nearer 3000 feet, giving one a hard climb in a mid-day tropical sun, and for five hours without water. For two hours we skirted the valley high up on the mountain-side, with magnificent scenery stretching away to the north-west. Half-way down we came to a spring of water, and a native brought in a bunch of grapes the size of small peas.

Our last camp was at Muang Tung, where three of our mules were killed by tigers during the night, close to the village. Fortunately the march to the Nam Tay was only some nine miles, and very easy travelling down a narrow valley studded with villages. The post is on the north bank of the Black River, and a boat shoved off to take me over. On landing on the rocky promontory, Captain Seignier and M. Pellitier came down to welcome me. As we climbed up the steep path I was shown a flood-mark sixty-six feet above the normal river-level. It was almost incredible. At Lai Chau the hills rise abruptly from the valleys of the Black River and Nam Ma, leaving space for only two or three native houses, as the half-company of tirailleurs take up the rest of the room. The Europeans were five in number; it is a deadly place for them, as the well-filled little cemetery only too sadly testifies. The Black River might well be so named, for its valley is precipitous and gloomy, and the valleys that run into it, excepting the one I descended, are steep and narrow, giving, in spite of the sun, a sombre and chilling effect. The gorge through which the river pursued its course was particularly precipitous, and was a mere cleft in the range of mountains. A storm at night made not only the frail bamboo houses shake, but seemed as if it might sweep away the very mountains in its tempestuous rush down the defiles.

Here I had to part with my men, except the Chinese interpreter. After some delay in getting coolies for my boat, I left Lai Chau on March 11th, carrying with me the warmest recollections of the hospitality I received at the hands of the two French officers, who greatly envied me my departure.

The first day of the descent of the Black River there were many rapids to shoot, and it was exciting work to see how swiftly the natives turn the boat in the midst of the boiling water, which comes foaming and splashing over the sides. The first three hours the mountain-sides were precipitous, then the hills became lower and more jagged with isolated pointed rocks. The right bank, for about a quarter of a mile near to Na Shan village, is an unbroken face of rock, hundreds of feet high, with numerous caverns at the base worn away by the water.

At Van Bu a new French post was in course of construction, and the three or four Europeans there complained terribly of the fever exhaled in disturbing the soil. The officer in charge was a piteous spectacle; he could barely move for weakness.

Ta Chan, a little lower down the river on the right bank, is the port or point of landing for Son La Chau. A sergeant commanded the post; he was one of the few Frenchmen I met who had a good word to say for the Black River, either in the way of health or productiveness. The

minerals he especially mentioned as being in abundance, and showed me specimens of gold, lead, iron, and copper. But so far as I could see, till the delta is reached, the sides of the river are almost uninhabited, and fertile soil was quite wanting, though I was informed that flax, maize, and cotton are grown on the hills. To me there appeared the greatest difference between this country and the Shan States, the advantage lying with the latter.

A large rapid occurs below this place, and then the current was slow till we reached Takao, where the steamer in which M. Pavie attempted to ascend the Black River was finally wrecked.

I arrived at Cho Bo just six weeks after the catastrophe when the Resident, M. de Rouvigny, was killed by dacoits, and the settlement entirely burnt. The other Europeans escaped into the jungle; but a French officer, and a Frenchman travelling under his escort, arriving at the post after the event, were both murdered by the militia, under orders from the chief of the dacoits. The militia then joined the dacoits, with a large amount of ammunition and rifles. When I arrived, but little had been done to rebuild the place, and the marks of bloodshed were yet visible. At Cho Bo is a barrage of rocks, an obstacle to steamers going higher up the river, which otherwise they could easily do as far as Van Yen. I descended the river from Cho Bo for some distance in the gun-boat *Montbrun*, and then, owing to the shallows, I had to continue my journey in a *sampan*, or large boat, as far as some curious rocks on the right bank, called from their close resemblance to the church, Les Rochers de Notre Dame.

I had a sail hoisted on the *sampan*, the ropes of which were the bark of some creeper. We moored for the night at a post called Les Mines de Cuivres, or Copper Mines, but, warned by two *sampans* bringing up ammunition that pirates were about, we anchored in the middle of the river, and remained undisturbed. After passing the massif of Mont Bavi on the right, the delta of Tonkin may be said to commence. Chinese pagodas and occasionally brick dwellings were visible amid the numerous villages. The junction of the Red and Black Rivers is a very tame piece of scenery, the banks are low and flat and treeless, and the water thick and with but little current. Viétri is a large military post where the great Clear River joins the Red River. Here again was bustle and excitement, as a large body of troops were starting to-morrow in search of some marauders. Enlivened by one or two false alarms of pirates, we reached Hanoi, the capital of Tonkin, and there was a charm, though a sense of awkwardness, in approaching again a place boasting anything of Western civilisation.

A steamer runs every day to Haiphong, the port and seat of commerce of Tonkin. There are fine warehouses, but nothing in them. The Chinese have left the place. Piracy flourishes within a mile or two of the town, and the ground remains uncultivated, natives being afraid to go far from the village. Undoubtedly, however, the delta is rich in soil and in minerals. There is a seam of coal, a little way to the north at Hong Gay, 169 feet thick. Unfortunately the French home policy has retarded the development of the resources of the country.

I visited in a coasting steamer the different magnificent harbours on the Annam coast. Rolling green hills, that look as if they would afford excellent pasturage, embosom fertile valleys. The coast, like the delta, is healthy, a contrast to the fever-stricken mountains of the interior. I landed at the charming town of Saigon, having everywhere met with the greatest kindness from the French.

The "Rue Paul Bert" is quite European, and the other roads are well kept; the success of the place, though, is entirely dependent upon the large official population. Improvements are being carried out, the most interesting feature being perhaps the Horticultural Gardens, started for the purpose of introducing into Tonkin new plants for cultivation. The results have been hitherto most satisfactory; and apparently tobacco, cotton, and coffee can all be grown. At present the natives are content with producing paddy, opium, and castor oil. The military quarters on the river-bank are good buildings in well-kept compounds. Except one or two pagodas, there is little of interest to be seen in the town. Here my travels across Indo-China really ended.

It may be of interest to notice briefly the commercial and political situation of those districts of Indo-China that I visited. The Shan States are in part tributary to us, Chieng Hong being the only state about whose political position there is any uncertainty. There is no doubt that Chieng Kheng is by rights tributary to Chieng Tong, and therefore to us if, as I have already stated, the Indian Government will have the courage to extend their frontier to its proper limits. My reasons for trusting that they may not be unwilling to accept this responsibility may be summarised as follows:—

The Sawbwa is, I believe, anxious to be under British protection, and the Siamese cannot possibly advance any sound claim to authority over him. If we neglect to accept the submission of this state, it may be well construed as mere weakness on our part, and cause irritation to the Sawbwa of Chieng Tong, the immediate superior of the state. The increase of responsibility would be hardly appreciable compared with what we incurred when we took over Chieng Tong, the capital of the latter being a month's journey from our nearest military post, and inhabited by a population of a rather turbulent character. Our present frontier already rests on the Me Kong, and the inclusion of Chieng Kheng would only place it three or four days' marches farther east. But then we should be in possession of an excellent mountain frontier, with no paths practicable for even pack animals between Muang Sai in the south and the parallel of Chieng Hong in the north. A river frontier is never desirable. Questions as to the use of the water, rights of fishing, tolls, etc., are sure to arise. Therefore, as it may be considered certain that we and the French will become neighbours, it is better we should, whilst there is the opportunity, select a frontier which is most likely to avert complications. The territory also is fertile, and though the day may not yet have arrived for a railway, it is as well to have command of the whole valley for the development of communications. Likewise our presence would afford some moral support to Chieng Hong, and that portion of Nan lying on the left bank of the

Me Kong, against any advance by the French. Perhaps it may be objected that it is improbable that the French would wish to acquire fresh territory. The reply in disproof of this would be their past and present conduct, whilst with regard to their future policy, the Tonkinese newspapers, the writings of M. de Lanessan, the present Governor of French Indo-China, the speech of M. Ribot recently delivered in the French Chamber, and, in short, many openly avowed declarations, show their intention to secure, as a minimum, all territories to the east of the Me Kong.

It would appear from the papers that south of Luang Prabang this policy has already been put into effect. But whether it has or not, it is sure of accomplishment; nor when it comes to the point are the Siamese likely to resist it. From the Annam coast, this last dry season, two or three expeditions were surveying, and searching for routes to the Me Kong. Shortly before I reached Dien Bien Phu, an officer had left to see if the country were suitable for a telegraph to Luang Prabang; and this would be an alternative wire, as the King of Siam has already authorised one to be laid from Bangkok. The French idea is that Luang Prabang can be made the centre for attracting the trade of Chieng Mai and the Shan States. The carrying of goods by the Me Kong may be considered impracticable. The Black River would be the only other means of transit. The expense would be enormous, and utterly futile against British competition from Burma. This, however, would not deter the French, and the opening of a trade route in that direction would make the Shan States, by their proximity, a more important market. Therefore it concerns us to watch closely any French movements west of Luang Prabang. Last year Messrs. Macey and Massy entered the Sibsong Pana with a view of establishing commercial relations with the different states, whilst M. Pavie, accompanied by a large retinue, visited Chieng Hong, the capital. Unfortunately there is no map to show clearly the geographical features, or it would be easier to bring home to the minds of the public, that the watershed of the Me Kong and Nam Doo would most fairly mark the respective spheres of influence of Great Britain and France, and would be the best guarantee against any possible friction. As a step towards securing this, it is desirable that the Indian Government should be urged to undertake the entirely legitimate responsibility of a protectorate over Chieng Kheng.

THE SMALL TRADES OF THE CAUCASUS.

By Victor Dingelstedt,

Hon. Corr. Member R.S.G.S.

The Caucasus possesses great natural resources, which were known in ancient times and attracted to it the enterprising nations of the Old World. The eastern shore of the Black Sea was studded with Greek

colonies, and the Argonauts' expedition, though, perhaps, only legendary, shows the importance attached to the wealth of this country by the brilliant predecessors of modern civilisation. In later times it has not been the fate of the Caucasus to become, like Switzerland, a seat of prosperous industrial communities capable of utilising its natural resources. It has been the home of warlike tribes and the theatre of sanguinary conflicts between the powerful nations who aspired to possess it. The pacification of the Caucasus is of quite recent date, for its subjugation by Russia was only completed in 1864.[1] No wonder, then, that in our days so much has been heard of the courage of its inhabitants and so little of its industrial activity. A brighter prospect, however, is probably in store for the Caucasus. This splendid country is suited for the cultivation of all kinds of cereals and of some important industrial plants, such as cotton, madder, castor-beans, etc.; it has soils favourable for vines, mulberry, and beetroot, and extensive grass-lands for cattle and horse-breeding, and its beautiful forests and rich mines of petroleum, silver, copper, sulphur, etc., offer attractions to enterprising companies and individuals. To these natural advantages must be added an intelligent population, that requires only to be instructed and more thoroughly protected from brigands in order to compete with those of other lands in useful arts. One of the Caucasian industries, viz., the extraction of petroleum, has already attained a considerable development in a relatively short time.[2] Viticulture also is extending as the Caucasian wines become known in Russia, and such is the case, to a less degree, with sericulture. But the industrial energies of the people have been too long kept in abeyance to show at once any marked activity. There are as yet too many obstacles to such progress, and until they are removed the country can hardly aspire to take, in the industrial world, the place which its natural resources must ultimately gain for it. Besides ignorance, with its attendant aversion to change and breach of faith, besides insecurity, want of credit, and adequate means of communication, which retard progress in every direction, there are obstacles peculiar to each branch of industry, which it would be beside my purpose to enumerate.

Caucasian industries may be classified in two groups:—staple industries and petty or home industries. Except Baku, which has an important mining industry, the Caucasus is an exclusively agricultural and pastoral country; its urban population, in respect of its occupations, does not much differ from the rural. Towns are the seats of the judicature and civil administration; in them also markets are held, but their inhabitants, unless they happen to be merchants or officials, cultivate the soil, breed cattle, and rear horses like the villagers. As these occupations leave a large portion of time unoccupied, and barely yield the necessaries of life, the peasants supplement them by petty home industries. It is of these that I purpose to treat in this paper, with the view of giving the reader some idea of the habits of the Caucasians and their general culture.

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[1] Some details about the latest stage of the struggle are given in my paper, *S.G.M.* vol. v., p. 367.

[2] The quantity of petroleum extracted amounted, in 1890, to 600,000 tons.

During my stay in the Caucasus, about five years ago, I had the good fortune to initiate the investigation of these petty industries. In consequence of my report on the subject, read before the Caucasian Agricultural Society, Mr. Janovsky, Superintendent of Public Instruction, conceived the idea of intrusting to his numerous subordinates (schoolmasters, scattered over the whole country) the task of collecting information concerning the usual occupations of the people. The plan was carried out, and I have now before me a bulky illustrated volume, in which are collected the results of the observations made by the schoolmasters.[1] Though without special knowledge of industrial arts, they have been able to produce by their united efforts a fairly accurate and suggestive account of the occupations of the Caucasian peasants. There are, of course, no statistics; but as a contribution to the history of the development of industrial art an account of this kind is certainly not devoid of interest, for those especially who regard it from an ethnographical point of view. These small industries have an essentially domestic character, being pursued in the peasants' homes with the material at hand, and usually without any trade organisation. Supported for the most part by local demand, they are of no importance in the general commerce of the country, though some products, as, for instance, silver filigree work, woollen materials, and embroidery, might, with a higher degree of finish, become lucrative and acquire some reputation beyond the Caucasian frontier; but such are exceptions to the rule. All appliances and implements used in those industries are of the most primitive description, and factories and workshops are almost unknown, the work being done in huts, tents, in the fields, and in the street. The profit is ludicrously small. As at present there is no division of labour, an artisan generally carries on several trades at the same time, and is, naturally, proficient in none. A hatter is also a currier, a maker of sheepskin-coats, etc.; a mason is also a setter of stoves, tombstone maker, paviour, etc. In some branches of industry there are associations of workmen (*artel*), as, for instance, in masonry, carpentry, the manufacture of pottery, etc., and the members of these associations sometimes wander from place to place. No preventive measures are taken against the injurious effects of certain processes. "The destiny of man is unalterable," say the people, "and a man has no right to count the dead."

The nature of the small industries naturally varies with the raw material to be had in the neighbouring country. On the Black Sea coast, and generally in the western part of the Caucasus, there are different kinds of wood. The most appreciated are walnut, fir, and palm. The timber trade suffers from want of roads and the uselessness of the wild mountain torrents for the purposes of transport. Wool and skins are to be had in the eastern and southern parts of the country, where considerable flocks of sheep and herds of cattle graze on the elevated pasturages. Many nomad tribes, whose principal occupation is the breeding of cattle, excel in carpet-making. Cotton is planted on the plains of the Kura

[1] *Sbornik materialof dlia opissania miestnostey i plemën Kavkasa*, Tiflis 1891, 8vo, pp. 376+320.

and Araxes. Flax, hemp, and other textile plants are to be found here and there in small quantities. Madder grows in Daghestan, and oil-seed on the lowlands. Petroleum is extracted in many parts of the country, though it is found in greatest abundance on the Apsheron peninsula, and copper in the provinces of Tiflis and Elisavetopol; there is also sulphur in Daghestan; coals in the province of Kutais; and clay in various parts.

The second factor determining the particular forms of industry is the nature of the popular wants, and it is, perhaps, expedient in the next place to obtain some idea as to what those wants are. It is, of course, necessary to distinguish between highlanders and lowlanders, between nomads and fixed communities, between the inhabitants of those parts of the country where the climate is dry, the forests few, and the cold intense, and those of other parts where humidity prevails, the forests are extensive, and the winters temperate. All these different conditions of existence will certainly produce corresponding divergencies in habits, and cause different articles to be regarded as necessities of life; but these divergencies are less important than one would be disposed to imagine. Those Caucasians who retained their migratory manner of life, dwell, according to the seasons, on the plains or in the mountains, and, thus migrating from one part of the country to another, they have learned to adapt themselves to changes of climate and physical surroundings, and the very variety of their experiences has produced a uniformity in customs and habits. There is, besides, at work the levelling influence of an almost identical degree of culture, which circumstance has produced, even between Mohammedans and Christians, a resemblance in manners, habits, and the necessities of life. I will consider these necessities in connection with the industries to which they give rise in the following order:—(*a*) Food; (*b*) Dwellings; (*c*) Clothes; (*d*) The dressing of leather and fur; (*e*) Tailoring and embroidery; (*f*) Arms and smith's-work; (*g*) Pottery and basket-making; (*h*) Working in wood; (*i*) Fuel and light.

Food.—It is not my purpose to speak here of industries connected with the actual production of food-stuffs, such as agriculture and cattle-breeding, which are staple industries; but I will only make some remarks on the usual style of living and the preparation of food for table. The Caucasians must be admitted to be a temperate and sober people. There are many who eat only once a day, and even then very often moderately. Among the rich people the meal consists of a mutton broth flavoured with saffron, called *tchakhyrtina*, a leg of mutton roasted on the spit (*shashlyk*), different preparations of rice, cheese, fruit, and bread. The bread is unleavened, and baked in the form of a flat cake about 60 centimètres long and 30 broad; it serves also as a napkin. Sweetmeats are reserved for feast-days. Christians drink freely of home-made wine, while Musulmans consume divers fruit-waters. Among poor people the daily meal consists often of bread, fruit, and cheese only. In Western Caucasus bread is prepared from maize. Thus, cheese, bread, and fruit are the most important articles of food. Cheese, mostly of an inferior quality, is prepared by Armenians, Tartars and Kurds during their stay in the mountains; this work occupies the women. One poud (36

lbs.) of cheese is to be had in Novobayaset, one of the centres of cattle-breeding, at the price of 1·80 to 2 roubles. The milk of sheep, cows, and bisons is used in its preparation. Butter is made chiefly for sale in the towns; 36 lbs. of butter fetch 10 roubles. A large variety of delicious fruits grows in the Caucasus, and a considerable quantity of dried fruit is imported from Persia. The cereals (maize and wheat) produced in the Caucasus are more than sufficient for local wants, and, therefore, a surplus remains for exportation.

Dwellings.—Caucasians dwell, as a rule, in miserable homes, and there are still some nomad tribes, who, having no fixed abodes, dwell in tents or caverns. The ordinary one-roomed cottage (*saklya*) is built in the mountains of unhewn stone, laid without cement, on the plains of *adobé*, in a most primitive fashion. A hole in the earthen floor in the centre of the room serves as a hearth, and the smoke escapes through an aperture left in the flat clay roof. Men and animals often herd together. The construction of such a dwelling does not require professional masons, who, mostly Persians or Italians, find employment in the towns. Persian masons arrive in crowds during the warm season, and on the approach of winter return home with their earnings. Besides building private dwellings, they construct warehouses, lay pavements, quarry stone and fashion it into millstones, tombstones, etc. Bricks are seldom used except for warehouses, though unbaked bricks are often employed as material for houses where stone is scarce. The usual wages of a professional mason vary, according to his proficiency, from one to two roubles a day (two to four shillings).

Clothing.—The Caucasian is fond of dress, and, though he neglects home comforts, is by no means indifferent as to his personal appearance. Objects of value he may possess, but he lays little store by anything except clothes, arms, and ornaments, which he can carry on his person. The costume is rich, many-coloured, and highly picturesque, and each tribe has preserved a distinctive style. The nomads prefer large floating dresses in shades of red, while the highlanders, on the contrary, wear tightly-fitting garments, which show off their fine figures to greater advantage. Most of the men wear an under-vest of printed calico, a jacket or tunic (*beshmet*) of silk, wool or calico (with a standing collar and fastened by hooks), and large pantaloons (*shalvar*) of wool or velvet. Above the *beshmet*, descending to the knees and closely enveloping the body, is worn the picturesque *tcherkesse*, a long gown with hanging sleeves slit up to the shoulder, and a long row of metal shot cases on each side of the breast; at the neck the garment is thrown open a little. Underneath the *tcherkesse*, which, according to the season, is of wool, silk, or calico, a belt, embroidered with gold or silver, is tightly laced round the waist of the *beshmet*. From this belt are suspended poniards (*kinjal*), with richly decorated hilts. In cold or wet weather this attire is completed by a large sleeveless felt mantle (*burka*) thrown over one shoulder, a long gun being suspended upon the other shoulder, and by a high lambskin cap (*papakha*) upon the head. There is, however, a great variety of head-coverings, from a small light cap of embroidered stuff perched on the top of the head, to a tall astrachan hat about 7 lbs.

in weight. The feet are encased in woollen socks and leather slippers. Boots are as yet adopted only by those who have been in Moscow or St. Petersburg, and pride themselves on their superior refinement. The women's costume is still more ornamental. Over underclothing of printed calico, the Georgians wear a short silk or woollen jacket (*gulispiri*), usually embroidered with silk, gold, or silver thread, and low at the breast and shoulders. Above the *gulispiri* is worn, by rich and poor alike, a gown descending behind to form a train, and also opened on the breast, where a quantity of ornaments hang. A long and broad silk sash of bright colour confines the waist. Over the gown is thrown a kind of mantle (*catiba*), corresponding to the men's *tcherkesse*; it is richly embroidered on the front, and is edged all round with fur. Velvet is the material preferred for the *catiba*. On the head the Georgian women wear a small crown-shaped hat (*tasakrava*), broader at the front where it is embroidered; to the back is attached a long white muslin veil. The small feet are clothed with wool or thread stockings and embroidered slippers, not very easy to walk in. It would take too long to describe the numerous tribal peculiarities in female dress, but it should, however, be noticed that Armenian and Tartar women appear in the streets covered from head to foot, the former with a white calico *tchadra*, the latter with a *tchadra* of blue cotton cloth (*bias*).

Some Armenian women conceal the lower part of the face with a white bandage. As may be concluded from the above, the greatest number of small industries are connected with dress. We will now shortly consider these industries, viz., the manufacture of silken, woollen, cotton, and linen goods, the preparation of leather and fur, hat-making, dyeing, and tailoring. Spinning and weaving in wool occupies a foremost place, wool being one of the principal raw products of the country. Nor is this material confined to dress, but it is also largely employed for carpets and cushions, which constitute almost the sole house furniture, and tents, which are so indispensable in a semi-nomad life. There are no woollen manufactories proper, so that all woollen materials which native labour is unable to supply are imported from Russia or other parts of Europe. Owing to the high duties imposed on foreign wool and the prohibition of its importation into Persia through the Caucasus, Russian manufacturers have a virtual monopoly in such goods. The greater part of the wool produced is employed for the weaving of carpets and saddle-bags (*kilim*). Carpet-weaving is properly the occupation of women, and there are few Tartar households where some kind of loom is not to be found.[1] Women pursue this industry not only for gain but also as a pastime; the profit is, indeed, quite unimportant. A female worker is satisfied when she can get from five to twelve kopecks (1½d. to 3d.) for her day's work of twelve hours. The carpets woven for sale have often a cotton woof.

The principal seat of this manufacture is Shusha, which has practically a monopoly in the art. Apprenticeship is surrounded with many

[1] Sometimes, for want of a loom, the warp is attached to a simple arrangement of wooden pins.

difficulties, owing to the deep distrust existing between Christians and Tartars. A Christian would object to sending one of the female members of his family to serve as apprentice in a Tartar family. Tartars, on the other hand, are averse to allowing their daughters to learn a trade, for a girl of ten years old is considered to be of marriageable age, and her parents are anxious to procure a husband for her at once. Carpet-weaving is an art introduced by the Tartars, who continue to maintain their superiority therein. Besides the obstacles to apprenticeship, the Christians find it also difficult to procure wool at a reasonable price. The flocks of sheep are owned by Tartars, and, in order to buy wool at a low price, it is necessary to visit their encampments during the shearing-time, an undertaking said to be attended with danger. Spring wool may be had in the camps for 2-3 roubles a poud (36 lbs.); autumn wool is sold at double that price, whereas, if bought from a broker, the former costs 5-6 roubles a pound, and the latter 7-8 roubles. The Tartars sell their wool in a filthy state, rolled up in the leaf of the animal. Before the wool is made into carpets it must be washed, carded, and spun into thread. The last process usually costs 10 kopecks (3½d.) for a lb. of thread. Then comes the twisting and dyeing of the threads. The animal and vegetable dyes employed are good, the chief being madder, but the mineral colours are inferior, as, for instance, artificial alizarin. The carpets bear different names, and fetch different prices according to pattern and size: the *khaly*, a carpet used for the middle of a room and measuring 2 mètres broad and from 5 to 7 m. long, costs from 60 to 120 roubles. The *yan*, 1 mètre broad, is used to cover the floor between the walls and the carpet in the middle; two *yan* costs as much as one *khaly*. The term *ghiaba* includes all carpets the breadth of which is intermediate between those of the *khaly* and the *yan*. Besides these there is the *takhtustu*, a carpet 1·8 mètres broad, and 3 m. long which is hung on the wall above the sleeping-place, and the *jeinamaz*, a small carpet (1¼ by ¾ m.) to kneel upon at prayers. The patterns are distinguished by the names of the natural objects they are supposed to represent, such as *balykh* (fish), *buta* (almond), etc.

Though the carpets of Shusha are considered the best in the Caucasus, they are inferior to the Persian and Tekke, the wool being of inferior quality. Nevertheless, they have of late been exported to St. Petersburg and Constantinople. It is approximately estimated that Shusha produces carpets to the value of £20,000 annually.

From carpets properly so called must be distinguished felts (*palassy*), which are of no great value. There are two kinds of *palassy*, the striped (*yerpalassy*) and the figured (*kilim*). A *palassy* costs usually half as much as a carpet of the same size. Weavers generally make carpets to order from material furnished by the customer.

Besides Shusha and its district, the manufacture is carried on in the following localities: Akhaltsykh, Gadrut (Jebrail district), Akhalkalaky, Kasapet (Jeranshid), Kubinssy district.

There are also the following kinds of woollen goods: cloth (*shali*), felt saddlebags, (*khurjeis*), carpet-bags (*maphrash*), hosiery, etc. Cloth of rough texture, 14 inches broad, is sold at from 20 to 50 kopecks the arshin (28 inches). Its production is very restricted. Felt is more ex-

tensively manufactured. For this article wool of inferior quality is employed. In felt-making men as well as women are engaged; this industry is sometimes regarded as a handy occupation for spare hours, while in other cases it absorbs the whole time of the family. According to quality felt is employed for *burka*, carpets, hats, saddlecloths, blankets, etc. The *burka*—a large mantle much worn by highlanders—is almost waterproof; to make it from three to six sheep are required, and it sells at from two to three roubles and more, according to the quality.

Druggets, hats, saddlecloths, and blankets of felt are in very general use, but Caucasian felt is not remarkable for its excellence, and this industry pays badly. In the Gadrut district of Jebrail a felt carpet of 650 square feet can be bought for eighty roubles, the cost of the material being about forty roubles, so that only forty roubles remain to remunerate five artisans for sixty days' work (about 13⅓ kopecks a day for each workman). Felt is made in the same districts as carpets.

There is also an extensive manufacture of woollen hosiery, which gives occupation to the women in almost all parts of the country, and especially in Sharapan, Kutaïs, Ratcha, and certain Musulman districts. Nine pounds of raw wool are usually converted into about 1·8 pounds of thread, sufficient for eight pairs of stockings, which sell at forty to fifty kopecks a pair. One pound of woollen yarn being worth about twenty kopecks, about four kopecks only are left as a recompence for the labour of knitting a pair of stockings. Cotton and flax, after wool, are the most important material for clothing. The Caucasus should be able to satisfy its own demand for cotton goods, but, such are as yet the difficulties in the way of establishing manufactories, that the cotton grown in the country goes mostly to Moscow in order to return in the form of calico. Consequently it figures here rather as an object of cultivation than as material for manufacture. Though this cultivation is not one of the small industries I am describing, I may perhaps be allowed to say a word or two about it. It has never attained to any great development, though during the American war there was a good opportunity for considerable extension, had the Caucasian planters known how to avail themselves of it. Cotton plantations are as yet to be found only in the southern Trans-Caucasian districts—Erivan, Elisavetpol, Baku—in the plains of the Araxes and Kura. Should irrigation be extended and regulated, there may yet be found in the eastern Caucasus wide tracts, now unproductive, which are perfectly fit for cotton-growing. Native cotton is, however, not much appreciated, and some of the cotton worked in the Caucasus is grown in Central Asia and is imported from Moscow. As to the cotton manufacture, it is only in Akhaltsykh and Tiflis that it has any commercial importance. Elsewhere small quantities of yarn and a coarse stuff called *khami*, used for underclothing, are produced for local requirements. In Tiflis there is a small manufactory which prepares a sheeting called *bias*, employed for underclothing and *tchadra*. In Akhaltsykh the cotton—partly imported from Moscow—is worked into loose towels and spongy rubbers used by the Tartars in bathing. Here the workmen are dependent on the merchants, who, as a rule, supply the materials. A weaver earns from twenty-five to forty kopecks a day.

A piece of calico (2·5 arshin long by 1·25 broad) costs fifty to sixty kopecks; a sheet weighing about 0·9 pounds from 1 rouble to 1·20. The number of hands occupied in weaving cotton in villages is constantly decreasing, Moscow manufacturers being able to offer cotton cloth and printed calico superior to the loose and coarse native *khami* at lower prices. Of still less account is flax as a textile plant; it is indeed cultivated on a very small scale in the districts of Sukhum, Shemakha, as also in Erivan and Lenkoran, etc., but the material manufactured from it is too coarse to be employed for any other articles than bags. In Marasy (district of Shemakha) a mixture of linen and cotton called *carpinka* is made into shirts. The poud (36 lbs.) of linen yarn is worth from three to five roubles. In Erivan and the Musulman provinces flax is cultivated for the sake of its oil. Linseed-oil is sold in Shemakha at five to six roubles a poud.

Sericulture and silken goods.—Silk is largely used in the Caucasus for garments, bedding, and furniture. The rearing of silkworms is an occupation dating back to the remotest antiquity. They are known as Job's worms, an ancient tradition relating that the worms which attacked the patriarch were transformed into silkworms as a reward for his patience under suffering. The climate is very favourable to the growth of the mulberry, and in fact the tree flourishes in every part of Trans-Caucasus. Notwithstanding this, sericulture is far from being in a prosperous condition. It is, however, one of the most wide-spread industries, and enables the female part of the population to make a little addition to their comforts. With better methods, more knowledge, and fewer prejudices, this industry alone might make the fortune of many parts of the Caucasus; even as it is, it is not without importance. Silkworms are bred in all parts of the Trans-Caucasus, but especially in the districts of Kutaïs, Nukha, Geokchai, and Shemakha. The eggs are imported from France, Italy, and Japan, through the instrumentality of the local administrations and the Caucasian Agricultural Society, which is subsidised by the Government. Italian eggs cost about 70 kopecks for five grammes; they are often distributed gratuitously. Their vitality is often destroyed by transport, casualties on the way, and change of temperature. The usual time to rear silkworms is about the middle of April; the silk is obtained in from six to ten weeks. The eggs are hatched by women in the hollow of their armpits. There are no special buildings for the rearing of worms, but any unused covered space is considered suitable for the purpose. There are a multitude of superstitious rules which it is thought necessary to observe during the time of rearing to ensure success. It is scarcely necessary to mention that such rules, being dictated by ignorance, often produce the opposite effect, and very often the poor insect does not live long enough to spin its cocoon. Of course much depends upon the weather. Five grammes of eggs, if all goes well, will result in about 25 pounds of cocoons. In this case the enterprise is highly remunerative. But usually a great number of worms perish prematurely, and then the female worm-breeder is satisfied if her pains and patience are rewarded by a profit of a few roubles. Fresh cocoons are sold at 9 to 17 roubles the poud (36 lbs.); dry cocoons at about three times that price. To produce

one poud of raw silk from 20 to 22 pouds of fresh, or from 8 to 9 pouds of dry, cocoons are required. One poud (36 lbs.) of raw silk is valued at about 100 roubles (1 lb. at 2·75 r. to 2·52). There are no reliable statistics of the quantity produced, and I can only state that in some places, where the sericulture occupies the greatest number of hands, as, for instance, in Geoktchai, Jebrail, and Nukha, the annual production of cocoons attains the respectable quantity of 1500 cwt.

There was formerly a considerable number of silk-mills of native construction; but recently they have been disappearing in all parts, and in their place silk-mills after European models, and worked by steam-power, have been erected. Such silk-mills exist now in Jebrail, in Gadrut, in Nukha, Ordubat, Akulis, Shusha, and other places. There are about twenty silk-mills in the districts of Shusha and Jebrail. In some of them women are employed. A working day is from 14 to 16 hours; wages range from 20 to 30 kopecks a day; the sanitary conditions are most unsatisfactory. A considerable quantity of cocoons, raw silk, and filoselle is exported to Russia, Persia. and Europe.

Some raw silk is woven on the spot in the primitive looms of the country. These home-made fabrics are known by different names, such as *daraja*, *kedji*, *tchesuntcha*, etc. Stockings, quilts, garters, purses, gloves, etc., are also made. Some of these goods meet with a certain appreciation at home, but they cannot compete with foreign productions, so that, though the Caucasian weaver values his time at next to nothing, their price cannot be maintained on the same level as that of such highly finished goods.

The Caucasian Administration is making considerable efforts to raise sericulture from the depression into which it has fallen during the last twenty years, in consequence of epidemics among the silkworms. Besides the distribution of sound eggs, instruction is given to youths in primary schools on the method of raising silkworms, and model institutions have been established.

The textile industries I have mentioned are by far the most important industries as regards the number of hands employed.

Leather and Fur-dressing.—Though the Caucasus is rich in flocks, the art of tanning is behindhand, and most of the leather is imported from Russia and Persia. Boots are as yet an article of luxury, most natives preferring small slippers, as being less expensive and more easily taken off on entering a place of worship or a drawing-room. Women wear no boots (except Russians), but slippers of Morocco leather. Shoe-leather is often dressed by Jews, and on that account the industry is considered by Musulmans as unclean. Workers in leather sometimes form associations (*artel*). The principal seats of leather-dressing are Alexandropol, Nukha, Elisavetpol, Marozy, Shusha, and others. There is a large tannery in Tiflis. A workman gets about five roubles a month. The price of a cowhide is from four to five roubles. Leather is used principally for shoes, saddlery, and *burjuk* (leather bottles). Shoes are made after the Asiatic and Russian fashions. In Alexandropol, where the trade is pretty large, one pair of Russian shoes costs, for men, from 4 to 6 roubles; for women, 2·50 to 4 roubles. The average annual earnings of a shoemaker

amount to about 280 roubles (about £28). Shoemakers are subject to consumption. Asiatic shoes, called *koshi* and *tchusty*, take the well-known form of Turkish slippers; one pair of *koshi* costs from 35 to 50 kopecks for women, and from 80 kopecks to 1·20 r. for men. Shoemakers, like many other Asiatic artisans, occupy small open shops in the market-places, where they sit cross-legged on a small bench.

Saddlery is pretty extensively made in the Caucasus, communication and the transport of goods being effected principally by means of horses, mules, and camels. Saddles are generally made of imported leather. The chief seats of saddle-making are Sukhum, Otchemtchiry, and Temir-khan-shura. Saddlers work in the same way as shoemakers, and their earnings are not much larger. In this trade there is division of labour; one man prepares the wood, another puts together the frame, a third covers it with leather, and a fourth adds the ornaments and other accessories. The saddles are of peculiar form, with high bows before and behind and short stirrups; they are always padded. The price of a saddle is from 20 to 60 roubles, and more, depending on the ornaments, which are sometimes of gold and silver. In Otchemtchiry saddles are made which fetch 5000 roubles. The annual earnings of an artisan are about 150 roubles.

In connection with the leather trade, a few words may be said about furriery. Leather-dressers usually prepare furs also, and make hats—fur hats, called *papakha*, being much in vogue among the Musulman portion of the population. As the Caucasus does not boast of good furs, sheep-skin is the most common material used by furriers. Hats are made of fur and coats of sheepskin. There are, in consequence, two kinds of furriers—hatters and tailors in sheepskin. The best hats, astrachan, are made of fur imported from Bokhara and Shiraz. A *papakha* may cost from 70 kopecks to 17 roubles, according to the quality of the fur. A hatter earns annually from 100 to 250 roubles. The principal seats of this industry are in Alexandropol, Zakataly, the district of Akhalkalaky (Okkam), Shusha, Saliany, etc.

An ordinary sheepskin coat costs from 3 to 6 roubles, the price of a skin being about 45 kopecks, so that the workman gets for his labour from 1 rouble 20 kopecks to 2 roubles 50 kopecks a coat, or from 25 kopecks to 30 kopecks for a day's work. Many highlanders wear sheep-skin coats even in summer, and therefore the number of these garments produced is considerable. They are made wherever flocks of sheep are kept. Camel's hair is woven into two kinds of cloth, highly appreciated by the highlanders, Lesghian and *tiftik*.

Tailoring and Embroidery.—There are but few professional tailors; on the other hand, there are certainly few women who do not know something of needlework. Most tailors work only in winter, being engaged during the rest of the year in agriculture. A tailor earns about 30 kopecks a day. He is usually paid by the piece, and makes up the customer's own material. For an ordinary jacket the tailor gets about 1 rouble. Sewing-machines have been introduced into almost all parts of the country. There are some itinerant tailors, who work in the market-places. Ready-made clothes are bartered in the markets for

agricultural products, but usually tailors work only to order. Workwomen are very badly remunerated. The Caucasians are very fond of embroidered clothes, and the needlework of the country has been famous for centuries. This industry is, however, declining, and it seems that Caucasians are becoming less fastidious about their dress. Embroidery is worked on velvet, silk, and woollen materials, with threads of silk, silver, and gold, and on morocco leather. It is mostly executed by women, but there are also skilful workmen, who embroider uniforms for Russian functionaries.

I have now to mention only one more industry connected with clothing, namely, dyeing. The cultivation of madder formerly constituted a staple industry in some provinces on the western shores of the Caspian, but the introduction of alizarin has partly ruined it. The dyeing of yarn for carpets is performed in a most primitive manner. The kind of dye, whether vegetable or mineral, depends on the destination of the carpet. If it be made to order or for home use, it is dyed with vegetable colour; if it be intended for sale, mineral dyes are used, which cost only 3 to 4 kopecks per ten grammes.

Arms.—After a handsome costume, the next things a true Caucasian cares for most are his weapons; and the manufacture of arms, especially side-arms, is an old-established industry. But, like so many other ancient arts, it is now declining, many famous armourers, who knew how to produce a weapon capable of cutting in two an iron bar of 0·3 inches diameter, having carried their secrets with them to the grave. However, the wearing of arms is still very general in the Caucasus, where nobody travels without a gun or dagger, and where even cooks and lackeys would consider it undignified to appear in public without *kinjal* (daggers). The best gunners and armourers are to be found in Daghestan (Temir-khan-shura), Nukha, Sukhum, Tiflis, etc. A good hand requires about one week to make a dagger. The price of a blade varies from 2 to 10 roubles. The sheath and hilt are usually ornamented. Those ornaments which embellish the belt to which the daggers are suspended are the work of gold- and silver-smiths, who had formerly a wide reputation in some parts of the Caucasus (Akhaltsykh). Many of these skilful craftsmen, however, emigrated into Turkey after the last war. I may here give a few details on other kinds of smiths' work. It is exercised principally in connection with agriculture, but smiths who work in copper and brass are also engaged in the production of ornaments and household utensils. As to agricultural wants, the villagers in some parts of the country are in the habit of engaging a professional smith to repair any agricultural implements at a moment's notice. In return for his services a plot of ground is allotted to him, which the villagers plough, sow, and reap for his benefit. The smith is also bound to shoe horses, bisons, and bulls. Some smiths make ploughs, sickles, scythes, and other implements, but these home products cannot bear comparison with articles imported from Russia and foreign countries, and so the native smiths are content to repair implements made by others. Indeed, their want of skill prevents the introduction of agricultural machinery. A heavy plough of native make costs from 40 to 50 roubles; a sickle

from 45 to 80 kopecks. The earnings of smiths are very variable, but a good workman can get one rouble for his day's work. Usually it is only during three or four winter months that a smith pursues his calling, there being no work for him in summer. Smiths in copper and other ores are to be found in Derbent and Alexandropol, but their trade is insignificant. There are copper mines in the Caucasus, but they are worked, very inefficiently, by Greeks. Moreover, copper is little used.

Pottery and Basket-making.—Most household utensils are of earthenware and basket-work. Pottery is a very ancient industry, in which women take a large share. Some of the vessels have curious forms, and others are of very large size, as wine-jars and bread-pitchers. No improved processes are ever introduced, and, indeed, there are even now potters who are ignorant of the art of glazing. In order to make a pot watertight, a bit of wax or pitch is melted and rubbed over the inside.

It is curious that the price of a pot is often determined by the quantity of wheat or maize it will contain. In the fabrication of some earthenware, pewter is mixed with the clay, as well as lead and glass reduced to powder. Pots are sometimes embellished with a variety of colours. In the production of this ware there are processes which masters are anxious to keep secret. A speciality of potters is the construction of *tandir*, a kind of stove in the form of a huge pitcher. The fire is made at the bottom, and slices of bread are placed round the inside to toast. In order to render the clay employed for *tandir* more cohesive, goat's wool is mixed with it. In many parts of the country, but especially in Tiflis, large pitchers are made, capable of containing about 500 litres of wine; these pitchers, buried in the ground, serve also for the storage of corn. The earnings of a potter are from 20 roubles to 100 roubles a year, seldom more. The better earthenware is imported from Russia, and the production of some kinds of ware, though Caucasus is rich in clay, is decreasing.

For gathering grapes, and other domestic uses, baskets are made from twigs of the willow, hazel, chestnut, oak, and other trees. This work, with which straw-plaiting is also combined, gives occupation to men and women, children and old people in many parts of the country. Sieves, also nets, cords, mats, etc., are made from bast fibres. Baskets of different forms cost 10 to 80 kopecks each.

Industries connected with Wood.—These flourish most in the western part of the Caucasus, where the forests are extensive; and here we meet with wood-cutters, sawyers, carpenters, joiners, turners, coopers, etc. Very often the same man is engaged in all these branches of industry, as well as those of a cartwright, box-maker, saddler, etc., but he is a Jack of all trades and master of none.

The woodcutters work hard for a trifling reward. By this occupation a family may get from 7 to 12 roubles a year. Sawyers are better off; they form co-operative associations, and during the season when there is no field-work they earn about 70 roubles each. Joiners and carpenters are, on the whole, still better remunerated, and yet some of the latter get only 20, or even 10, roubles a year. Carpenters usually

combine together into *artel*. Joiners are also glaziers, but they have not much work in this latter capacity, as in the villages mica or paper is often substituted for glass. Turners make house utensils, packsaddles, musical instruments (*balalaïka*), chests, cradles, etc. This occupation is not particularly remunerative, the earnings of a turner being estimated at the modest sum of about 10 to 20 roubles a year. The little wood-carving that is executed in the Caucasus is of a very rough description. Coopers have but little work, as wine is usually preserved in ox-hides, and water in stone cisterns—seldom in casks.

Fuel and Light.—Lastly, I have to speak of the small industries which provide fuel and light. In the eastern part of the Caucasus and at great altitudes the cold is intense in winter, and combustibles are scarce or deficient. Well-to-do people buy wood (which is to be had at Tiflis at the price of 10 to 12 shillings a *klafter* (one cubic *sajene* of beech costs from 50 to 60 roubles), or charcoal, which is burnt in a pan called a *mangal*, and placed in the middle of the room, so as to allow all those present to warm their feet; but the majority of the people are obliged to burn dung. The first object which strikes the eye on entering a Caucasian village are the heaps of *kisiak* (dung for fuel), and the preparation of it is certainly one of the principal businesses of the inhabitants in the eastern and south-eastern parts of the country. Cattle-dung is spread in court-yards to the depth of about seven inches, and, after being moistened with urine, is allowed to dry. Then the layers are cut up into rectangular cakes (16 by 10 inches) and arranged in tall piles, so as to let the air circulate among them. A hundred cakes are sold at the price of 1 to 3 roubles, but every family must provide its own stock, as it often happens that this fuel is not to be had in the market at any price. Artificial light is of less importance than fuel, being liberally provided by almost inexhaustible wells of petroleum in different parts of the country, and especially in the peninsula of Apsheron. It is also naphtha which to a great extent supplies the want of fuel. But the extraction and utilisation of this important article is one of those great undertakings in which such capitalists as Rothschild and Nobel are interested, not one of the small industries with which we have to deal. To such belongs the fabrication of tallow candles, generally coloured, used by the Musulmans in their mosques. It is, however, steadily declining, and, were it not that the Moslems object to the use of petroleum lamps in their churches, would soon die out altogether. Candles are made of ox and mutton fat in the simplest fashion, without even a mould.

The last industry I have to mention is the fabrication of soap, into the composition of which enter mutton grease, lime, and potash. All the members of a family often co-operate in the manufacture; the process is very simple and rough. To 1 poud of grease are added 2 pouds of potash and as much of lime; from this mixture $1\frac{1}{2}$ poud of soap is obtained. A soapmaker earns 40 to 60 kopecks a day; the price of soap is 8 to 10 kopecks a pound. The better qualities are imported from Russia and other European countries. Some statisticians affirm that the quantity of soap per head used by a people is a good indication of its degree of civilisation. Having no statistics at hand, I cannot, unfortunately, judge of the

civilisation of Caucasians by this criterion, but I presume that they are not lavish in the use of soap, for I have never heard of any soapmaker becoming rich. Independently, however, of this soap-test, there is certainly no inducement to form a very high idea of the Caucasian civilisation as far as it is revealed by its industries; but it is only just to remind those who are inclined to form a judgment on these grounds, that in the present case we have to do with an Asiatic country, influenced by ideas of civilisation very different from those prevailing in Scotland. A Caucasian may feel as happy, or perhaps even happier, than other people whose wants are more numerous, and industries in a more advanced stage.

THE MAPPING OF THE UNITED STATES.

By Henry Gannett,

Chief Topographer, United States Geological Survey.

Until recent years, the United States has been one of the most backward of all civilised nations in the matter of procuring good maps of its territory. Although, since the beginning of the century, geographic explorations or surveys have been carried on almost continuously, they have not been, until recently, prosecuted systematically, or under any comprehensive plan. The work done was carried on by various departments of the General Government, and under several State Governments; the methods of work and the scales differed widely, and the results were, in the main, fragmentary. The character of the work of these different organisations, and the results accomplished between 1802 and 1882, can be briefly told.

Under the War Department numerous exploring expeditions were sent out in the early part of the century to explore the unknown lands west of the Mississippi, and later, between 1848 and 1854, to discover routes for railroads to the Pacific coast. Of course, the results of these explorations were very crude, and the resulting map, though on a small scale, was largely guesswork, the areas between the routes of travel being filled in by hearsay from prospectors, hunters, and Indians.

Still later, several expeditions were sent out to make closer and more thorough explorations. The one which survived the longest, which developed the best methods of work, and which accomplished the most among all these army expeditions in the West, was that in charge of Captain G. M. Wheeler. This organisation commenced work in 1869, and continued until 1880. It mapped an area of 360,000 square miles, more than two-thirds of which was on a scale of 8 miles to one inch, or nearly 1 : 500,000, the remainder being on a scale of 4 miles to an inch, relief being expressed by hachures.

Between 1867 and 1872 Mr. Clarence King, a civilian in the employ of the War Department, conducted a geographic and geologic survey

or reconnaissance of the country adjacent to the Union and Central Pacific railroads. An area of some 86,500 sq. miles was mapped by it on a scale of 4 miles to an inch.

Between 1841 and 1881 the War Department conducted a survey of the shores of the Great Lakes. This survey, which was completed at the latter date, is of the highest quality in every respect. It was followed by surveys of the Mississippi and Missouri Rivers, now going on, which are also of excellent quality.

In 1817 a survey of the sea-coast was commenced under the Treasury Department, where it has since remained, excepting for a short period when it was under the Navy Department. Little was accomplished before 1832, since which time work has been actively prosecuted, and the survey of the sea-coast is nearly completed. Besides the shore-line, a narrow strip of littoral, from one to five miles in breadth, has been surveyed. The geodetic work of this organisation has been extended inland for various purposes, for the proper control of the shore-line survey, for connecting the east and west coasts of the continent, and to aid in controlling several State surveys.

It is unnecessary to characterise this work, as its excellence is thoroughly well understood throughout the world.

Under the Interior Department numerous explorations have been conducted, but none requires mention prior to 1867, when the western explorations under Dr. F. V. Hayden commenced, and Major J. W. Powell began his exploration of the Colorado River. Both these organisations, which commenced as geographic and geologic explorations of parts of the West, soon developed into systematic surveys. Their work was controlled by triangulation, and maps were produced by them upon a scale of 4 miles to an inch, with contours 200 and 250 feet apart, of an area of 167,000 square miles, lying in the Rocky Mountain region. They were discontinued in 1879. Under this department a reconnaissance survey of the Black Hills of South Dakota was made in 1875.

Early in the century, a system of subdivision of public lands for purposes of sale or other mode of disposal was adopted; and in accordance with this system, extensive surveys have been made, covering all, or the greater part, of all States and Territories in which public lands exist. The only States in which these surveys have not been made are the thirteen original States, Vermont, Kentucky, Tennessee, and Texas. This system of subdivision, which cuts the land up into approximate mile-squares, known as sections, requires the running of lines at intervals of a mile in each direction. These surveys, although not always well or even honestly executed, have produced fairly good State maps, showing the streams and other drainage features, and certain elements of culture, upon scales of 10 to 18 miles to an inch. The quality of the work is not such as to warrant larger scales, and the total absence of the relief element, except as compiled from other maps, reduces their value.

Some work has been done by the several States. Between 1831 and 1840 Massachusetts conducted, under Mr. Simeon Borden, what was

for the time an elaborate triangulation of its area, but no maps were made. Between 1877 and 1884 New York maintained an excellent triangulation, but failed to carry it to completion. The same State carried on a survey of its 'Adirondack Region' for many years, but no maps resulted from it. California carried on a geological survey from 1860 to 1874, by which large areas of the State were mapped, mainly upon a scale of 6 miles to one inch. Wisconsin, Kentucky, and Pennsylvania have surveyed small parts of their areas, and Minnesota has nearly completed a map of its area upon a scale of 4 miles to an inch with contours 50 ft. apart. This map, however, is imperfect in the fact that it rests for control on the surveys of public lands.

Between 1868 and 1878, New Hampshire made a map of its area, mainly, however, by compilation, upon a scale of 2½ miles to an inch, with contours of 100 feet.

In 1875 New Jersey commenced a survey of its area on a scale of one mile to an inch, with contours 10 or 20 feet apart. The work was controlled by triangulation, and is in every respect of quality commensurate with its scale. This was conducted by the State until 1885, when, the State being about one-half surveyed, the United States Geological Survey arranged for completing it, which has since been done.

Besides these surveys by the various Governments, certain railroad corporations have made surveys and maps of considerable areas, included within their "territory." Private individuals have, moreover, done a vast amount of surveying for the purpose of selling the resulting maps. These maps (and nearly every county in the Northern and Western States has been thus mapped) are little more than crude diagrams of the roads and railroads.

In 1882 the United States Geological Survey commenced to put into execution a comprehensive plan for making a topographic map of the country, and for the past ten years has been actively prosecuting the work. This work, although commenced as a necessary adjunct to a geological survey, is prosecuted on its own merits, and the maps are adapted, not only to the needs of the geologist, but to all economic requirements which their scales will satisfy. The scales adopted at first were 1 : 62,500, 1 : 125,000, 1 : 250,000, being proportioned to the social and economic importance of the region. The scale 1 : 250,000 has been abandoned, as being too small.

The contour-interval ranges from 5 to 250 feet, but contour-intervals greater than 100 feet have now been abandoned.

Sheets upon the largest scale extend over 15′ of latitude by 15′ of longitude, and those upon the second scale are 30′ in each direction. Many thousand sheets will be required to cover the country. Thus far, 703 sheets have been surveyed and 600 engraved. Of the sheets surveyed, 291 are upon the scale 1 : 62,500, 352 upon the scale 1 : 125,000, and 60 upon the scale 1 : 250,000. They are engraved upon copper, three plates being required for each sheet; cultivation and lettering being printed in black, drainage in blue, and contours in brown.

An area of 50,000 to 60,000 square miles is surveyed annually, and the entire area thus far surveyed is about 650,000 square miles, the area

of the United States being about 3,600,000 square miles. The area surveyed is widely distributed over the country, though much more attention has been given to the east than to the west.

In this work all pre-existing maps or determinations of position which are of suitable quality are being utilised. The work is controlled by triangulation. This is not of geodetic refinement, but is made amply accurate for the control of maps on the scales adopted. The secondary triangulation and all minor control is executed with the plane-table. The sketching of topography, *i.e.* the map itself, is done by the best topographers.

The above list comprises all the important mother-maps of the United States. From these have been compiled thousands upon thousands of maps for popular and special uses. An exhaustive list of them would fill many volumes, and the making of it would be an utterly profitless task.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

A meeting of the Society was held at Edinburgh on the evening of 21st January. Professor James Geikie presided. A paper on the "Gran Chaco," which we published last month, was read by Mr. Graham Kerr. Dr. Dods proposed, and Mr. Barker Duncan seconded, the vote of thanks to the lecturer.

On the following evening Mr. Graham Kerr repeated his lecture at a meeting of the Glasgow Branch of the Society. Dr. George A. Turner presided, and moved a vote of thanks to the lecturer.

The Dundee Branch of the Society held a meeting on the 29th January, at which Mr. Graham Kerr re-delivered his lecture on the "Gran Chaco." Captain Clayhills Henderson, Chairman of the Branch, presided, and moved the vote of thanks to Mr. Kerr.

Mr. A. J. Mounteney Jephson gave an account of the march through the great Congo forest of the Emin Relief Expedition, of which he was a member, at a meeting of the Glasgow Branch of the Society on the 11th February. Dr. Thomas Muir presided on the occasion. Sir Michael Connal proposed, and the Rev. Sholto Douglas seconded, a vote of thanks to the lecturer.

Mr. Jephson repeated his lecture at a meeting of the Aberdeen Branch of the Society on the evening of 15th February. Professor Ramsay occupied the Chair. On the motion of Mr. R. W. K. Bain, seconded by Mr. J. H. Bisset, Mr. Jephson was awarded a vote of thanks.

All the above lectures were illustrated by lime-light views.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.,

Assistant Librarian, R.S.G.S.

EUROPE.

The Deer-Forests of Scotland.—The deer-forests lie in the counties of Inverness, Ross, Sutherland, Caithness, Aberdeen, Argyll, Perth, and Forfar. The total area, according to a recent *Parliamentary Report*, is 2,690,731 acres. In Inverness-shire they occupy 30 per cent. of the land of the county; in Ross-shire 43 per cent.; in Sutherland 16·4; in Caithness 8·8; in Aberdeen 12·2; in Argyll 13·6; in Perth 5·1; and in Forfar 1·2.

Minerals in Banffshire.—The existence of rich deposits in Banffshire has been noticed recently in the *Dundee Courier*. Iron and manganese are found on the slopes of the Leicht Hills, near Tomintoul and Glenlivet on the one side, and around the Nochty Water and Allergue on the other. About fifty years ago manganese was extracted on the estate of the Duke of Gordon, but the price of the mineral fell, and then it was no longer possible to deliver it at Speymouth, 45 miles distance, at a cost low enough to leave a profit. One hundred tons of iron-ore, dug out twenty years ago as a specimen, yielded 72 to 75 per cent. of iron, and the distance now to be covered by a railway branch is only a little over twenty miles. Such a branch might be made to Ballindalloch, Boat of Garten, Ballater, or Alford. Another circumstance to be taken into calculation is, that the ore cannot be smelted in the neighbourhood, owing to the absence of lime and coal, but must be transported to Newcastle, Glasgow, or some other industrial centre.

Jan Mayen.—M. Ch. Rabot visited this island last summer in the French cruiser *Château-Renault*. On approaching the island M. Rabot found evidence of the presence of comparatively warm water in this part of the Arctic Ocean. The temperature of the water at the surface of the sea, close to the ice-pack, was found to be 44° Fahr. The vessel cast anchor off the east coast, and M. Rabot was able to explore the Esk and Faskruds fiords. At the head of the latter the basin is being filled up by glacier action, the soil of the moraines being deposited by streams on the sea-bottom. The levels of ancient terraces were observed at heights of 45 and 88 feet above the present level of the fiord. M. Rabot visited some twenty sheets of water at different elevations in search of lacustrine organisms, and collected a number of inferior forms of life, notably Arachnids, as also specimens of water for M. Thoulet's investigations.—*Compte Rendu, Soc. de Géogr. de Paris*, No. 18, 1891.

The Black Sea.—In May last MM. Spindler, Andrussof and Wrangell embarked on the *Tchernomorets* for another Black Sea expedition. They have ascertained that the depth of the sea, where it attains its maximum of 1367 fathoms, is nearly uniform over a considerable area. This deep basin lies between Theodosia and Sinope, in the centre of the sea. Between the mouths of the Danube and the Dnieper the depth does not exceed 100 fathoms. In summer the temperature of the water reaches a minimum of 44·8° F. at a depth of 30 fathoms. The observations on the chemical constituents of the water and on the fauna, recorded in vol. vii. p. 274, were confirmed by the results of the second expedition.—*Boll. della Soc. Geogr. Italiana*, Nov. 1891.

Finland.—The area of Finland is 144,245 square miles. Its undulating country forms a pleasing contrast to the dreary monotony of the Russian plains. At present it is divided into ten governments, but the original divisions are Finnish Lapland, Ostrobotnia, Karelia, Savolax, Tavastland, Satakunta, Nyland, and Finland proper, of which the last three, being situated on the coast, have made greater progress. Finnish Lapland lies almost entirely within the Arctic Circle, and is very sparsely populated in the ratio of one inhabitant to nearly four square miles. Reindeer form the principal wealth, some individuals owning as many as five or six hundred of these animals. Rye, oats, and vegetables are cultivated in small quantities. Ostrobotnia in its northern parts resembles Lapland, but on the shores of the Gulf of Botnia it is more thickly peopled and better cultivated, particularly along the rivers as, for instance, on the banks of the Tornea, at the mouth of which stands the town of the same name, on the Kemi, and on the Uleä, which enters the sea near Uleäborg, a provincial capital and an important commercial centre. The river Uleä, rising on the eastern frontier and traversing Ostrobotnia from east to west, is the chief means of communication, and serves for the transport of timber, wood-tar, and turpentine. It forms several lakes, the largest being Alujärvi (*järvi*=lake). In general the rivers are well stocked with fish: the Kemi alone yields on an average nearly 170 tons annually. Further south, on the banks of the Kyro, the soil becomes more fertile, and, with a greater abundance of material comforts, the habits of the people are more civilised. In Central Finland, comprising Satakunta, Tavastland, Savolax, and Karelia, the most picturesque scenery is found. Here are innumerable lakes, connected by rapid streams, and hills clothed with firs and pines. The country is divided into three drainage-basins. In the east the waters of Savolax and Karelia, forming 120 large lakes and some thousand smaller ones, flow into Lake Saima, and thence by the river Vuoksen into Lake Ladoga. From the central basin, in which are situated 650 large and small lakes, the streams converge to the Lake Päijäne, and reach the Gulf of Finland by the river Kymmene. Lastly, Satakunta and Tavastland are drained into the river Kumo. Besides serving as means of communication these rivers supply power to a number of factories and mills. Salmon is plentiful in those rivers which form rapids, as the Kumo, the Kymmene, and the Vuoksen. In the south and south-east of this central region, especially in Karelia, the bear is hunted, and in the south-west, in Tavastland, the wolf, reindeer, elk, and hare. Nyland and Finland proper, with the Aaland group, form the southern portion of the country. The soil being more fertile and the climate more genial, commerce and industry are more highly developed, and here are situated the most important towns—Helsingfors, Abo, Viborg, and Hangö. As might be expected from the elongation of Finland in a N. and S. direction, the climate varies considerably. While in the north the thermometer sinks to 58° F. below zero, in the south it seldom falls below 13° to 20°. The average rainfall is about 20 inches.

The population of the whole of Finland is 2,270,912, or 15·7 to the square mile. In the most populous part, Finland proper, the density is nearly 65 per square mile. The towns are small, Helsingfors containing only 55,740 inhabitants, and Abo 27,249. The population is composed of about 1,940,400 Finns, 350,000 Swedes, and small numbers of Russians, Germans, Laps, Gypsies, and Jews. The Finns are found everywhere, but those of purest race live in the central and northern districts. The Swedes inhabit the Aaland Islands, the northern part of Nyland, the south of Finland proper, and the coasts of Ostrobotnia. The Finns are not tall, but well-built and strong. Their heads are short and square, the eyes small and almond-shaped, the mouth large, the complexion clear, the hair very

light, and the beard thin and sandy. Those who dwell in Tavastland are phlegmatic and inclined to melancholy, but laborious, sober, thrifty, and hospitable, while the Karelians are more light-hearted and vivacious, more enterprising, but less persevering, and more impetuous. At one time they lived in the *Kota*, a tent of skins. This was succeeded by the *Pirtti*, a wooden hut consisting of one room without any aperture to let out the smoke, which is still to be found among the poorer inhabitants of Savolax and Karelia. The more prosperous, however, have houses of several rooms, with stoves and glazed windows, and often furnished with a certain degree of luxury. Besides agriculture the Finns rear cattle, and gain considerable profits from fishing and the products of the forests. The women, besides attending to the dairy, display great skill in the manufacture of a kind of rug of thick wool, and in the east make lace. The food of the country people consists of rye made into cakes and dried, barley, potatoes, and curdled milk. Fish is also eaten, but meat, salted and dried, very seldom. In bad seasons fine bark, straw, and bruised lichen are mixed with the flour to make bread. Marriages are celebrated with great pomp and a large consumption of food and beer. Funerals are also occasions for feasting. Christmas and Easter are celebrated with great solemnities, fires being lighted on the heights, and dances being held throughout the day. The Finns are passionately fond of poetry and music, and chant their popular songs to the sound of the *Kantel*, a kind of guitar more than two feet long with five strings.

The Swedes constitute the other important factor of the population, but they have intermingled with the Finns, and are distinguished from the natives of Sweden by greater versatility, more vivacity, and more promptness in deciding and acting. They appear to have a vague aspiration after independence, whereas the Finns, so long as they retain their privileges, are content that their country should be governed by Russia. In the country (for in the town the two races are completely fused) the Swedes have attained a higher degree of refinement than the Finns. Their houses are larger, neater, and more convenient. The kitchen is a separate apartment, and carpets are not uncommon.

Thirty-eight per cent. of the cultivated land and all the forest belong to the State ; the Communes and the Church own about 2 per cent., and the remainder is distributed in very small portions among private individuals. About 80 per cent. of the population is engaged in agriculture. All the usual domestic animals are kept. The horses, though small, are remarkably sturdy and have great powers of endurance. Cheese and butter are exported, the latter chiefly to Russia and England. Fishing and hunting are lucrative occupations, and skins of bear, ermine, martin, squirrel, and fox are exported in large numbers. Partridge, woodcock, and other wild fowl are sent to Russia and Sweden. The woods, which cover 64 per cent. of the whole surface of the country, yield large supplies of timber, turpentine, etc. Moss is exported to caulk ships, and wood pulp is manufactured for paper. Smelting occupies a good number of hands, and the iron-foundries turn out excellent goods. There are also manufactories of cotton and flax. The exports, consisting of the products of the industries already enumerated, were, in 1888, of the value of £3,619,370. The value of the imports was £4,488,750. They comprised hardware, woven materials, coffee and sugar, machinery, cotton, and oil, wine, etc. Communication is easy, and demands but little expenditure, owing to the number of natural channels which intersect the country. The railways have a total length of nearly 1000 miles. Two new lines are in course of construction, one from Viborg through St. Andree and Sordavala to Joensuu, and the other from Tammerfors to Björneborg. Telegraph lines extend over a distance of 2770 miles. —*Boll. del Min. degli Affari Esteri*, November 1891.

AFRICA.

The Massi Kesse Railway.—The route chosen for this railway starts from a point on the Pungwe opposite Inyamboyo, about 12 miles from the mouth of the river, and strikes the Busi at Jobo. This place is 12 miles from the mouth of the Busi, and may be reached by large vessels, such as trade between Europe and Africa, but the entrance of the river is rendered dangerous by shifting sands, and therefore a site on the Pungwe has been chosen for a harbour. From Jobo the railway will proceed to Massi Kesse through Meforga and Gomani, keeping about midway between the two rivers. Its total length will be less than 200 miles. The gradient will seldom exceed one in 100 over the first 150 miles, but near Massi Kesse it will sometimes be as much as 25 in 100. The longest bridge will have a span of 260 feet, and there will be one tunnel, a mile long. The first section of 100 miles will probably be completed at the end of this year and the remainder in 1893. The British South Africa Company's railway to Fort Salisbury will join this line at the bridge over the Muweni, near Massi Kesse.—*The Times*, Nov. 11th.

Dwarfs in Mount Atlas.—Mr. R. G. Haliburton, Q.C., has published in pamphlet form information he has collected regarding the existence of a race of dwarfs. It may be that individuals of such a race live in the Dra valley or its neighbourhood, though there is considerable discrepancy in the reports concerning them. Some informants state that they live in the Akka country, a barren district adjoining the Dra valley, while others affirm that the Akkas are not dwarfs, but that a tribe of pygmies exists at the town of Neseeg, close to Sus. Baraker, Ait Atta, Ait Tinker, Little Haratin, and other names are also assigned to them. This variety may, perhaps, be due to the fact that their Arab neighbours regard these dwarfs with superstitious reverence, and avoid speaking of them by their true appellation, just as the inhabitants of Europe used to speak of fairies as "the good people," "the little people," etc. They are described as about four feet high, broad and muscular, and of a light reddish-brown colour, thus resembling the Akkas of Monbuttu. By some they are said to be Christians, while others affirm that they worship Didoo Isiri (Osiris).

Liberia.—*Johns Hopkins University Studies*, ninth series, No. x., contains a sketch of the history of Liberia by Dr. J. H. T. M'Pherson. The idea of forming a colony of freed slaves originated with the Rev. Samuel Hopkins in 1773, but no decided steps were taken towards its realisation until 1817, when the American Colonisation Society was founded. In 1819 Congress passed an Act for the suppression of the slave-trade and the settlement of captured slaves on the coast of Africa, and, working in conjunction with the Colonisation Society, the Government agents despatched, in 1821, a body of emigrants to the region of Montserrado. On their arrival the native chiefs refused to fulfil the promise they had made of selling them land for a settlement. Under the leadership, however, of the Rev. Jehudi Ashmun, who came over with another body of emigrants, the little colony contrived to maintain its position in spite of the hostility of the natives, and by slow degrees gained in power until, in 1847, an independent republic was proclaimed, the first president being Governor Roberts, a Virginian Negro. In 1857 an adjoining colony, founded by the State of Maryland after the Negro rising in 1831, was received into the Republic as "Maryland County." From that time the State enjoyed a fair share of prosperity until Roye became President in 1870. His bold and ambitious policy soon exhausted the treasury, and a loan was negotiated in London for $500,000, which was taken up at 85 per cent. and, when

further reduced by commissions and fees, yielded the State only $200,000 net. Out of her small revenue Liberia has been quite unable to pay the interest, so that now the debt, increased by the accumulated compound interest, has reached overwhelming proportions, and has reduced the finances of the country to a desperate state. Another misfortune befell Liberia in the loss of a territory extending along some fifty miles of the north-western sea-board. It was purchased from the natives between 1849 and 1852, but, being left uncolonised, was in course of time occupied by British traders, in consequence of which, after negotiations protracted through about seventeen years, the boundary between Sierra Leone and Liberia was at length, in 1888, fixed at the Manna River. In spite of the present unfortunate state of Liberia, Dr. M'Pherson still looks forward to its taking an important part in the spread of civilisation and Christianity among the natives, and considers it as adapted for a refuge for American Negroes from the excessive competition in the United States.

Zambesia.—A few notes on the geography, geology, and prospects of this country have been contributed to a Johannesburg newspaper by Mr. Robert Jameson, brother of the Administrator of Mashonaland, who has had experience in gold-mining in all parts of the world. Proceeding northwards from Fort Tuli, the prospector meets with no features of interest until he reaches the river Loqua (?), but after crossing that river at a point 130 miles from Fort Tuli and about 30 south-west of Fort Victoria, he finds numerous indications of an auriferous country. Some very rich rock has been laid bare about 10 miles from Fort Victoria. The South Africa Company has chosen the Umnyati River for the south-western boundary of the prospecting area, not caring at present to push their operations nearer to Bulawayo, Lobengula's residence. This river passes near to Fort Charter, and flows in a direction 20 degrees to the west of north, receiving the waters of the Umzweswie and Umfuli; it enters the Zambezi, under the name of Sanyati, about 100 miles above Zumbo. Rich specimens of auriferous rock have been obtained between the Umnyati and the Umzweswie, and valuable reefs lie in abundance between the Umzweswie and the Umfuli. On the north side of the latter river strata of a permanent auriferous character appear at a distance of 30 miles down the river, and extend to the confluence of the Sanyati with the Zambezi. The Sanyati is probably navigable for its entire length of 100 miles, and the Zambezi presents no difficulties to those accustomed to navigate in shallow waters. There is only one portage between the sea and the Victoria Falls, and that is only 15 miles long. If, then, the Sanyati be navigable, there is a water-way leading into the heart of the auriferous region of Mashonaland. In the district of Lo Magondi, a dense forest, extending to the west and swarming with rhinoceros and the tsetse fly, has stopped prospecting in that direction, but to the north and east, on the head-waters of the Angwa River, several parties have been out. Between Sinoia's kraal, about 15 miles from Magondi's, and Chinengwa's kraal, the Kaffir track follows a chain of hills running parallel to the Nanyani River at a distance of 8 to 10 miles and rising to a height of some 1500 feet above its bed. Here also Mr. Jameson crossed a succession of very promising quartz reefs, intersected here and there by gigantic quartzite bars or laminated ironstone. Six miles from Chinengwa's, and 4 miles west of the Nanyani, lie some very ancient copper workings, which also contain silver and gold. The river can probably be navigated up to this district. The plateau of Mashonaland Mr. Jameson considers to be as healthy as the mining districts of Queensland, Mexico, and Arizona, lying as it does at an elevation of 3000 feet above the sea. The crops round the kraals near the Zambezi are marvellous. The finest tobacco is grown there, and the well-watered

limestone ridges are admirably suited for vines and fruit. Indigo, cotton, sugar, opium, and, above all, rice, might be produced in immense quantities ; but in the richest districts, in the valley of the Zambezi, imported labour would be necessary.

AMERICA.

The Highest Mountain in North America.—We are indebted to Mr. Israel C. Russell for the following communication :—"A statement in reference to the height of Mt. St. Elias, in a recent number of this *Magazine*, vol. viii., 1892, p. 49, suggests that later evidence in the same connection may be of interest:

The first expedition sent to Mt. St. Elias by the National Geographic Society and the United States Geological survey was in 1890. No reliable measurement of the mountain was then obtained, but eye-estimates, based in part on aneroid barometer readings, led to the conclusion that it could not be less than 15,000 feet high.

A second expedition, under the same auspices as the first, and also placed in my charge, was sent to Mt. St. Elias in 1891. During this expedition a base line 16,876 feet long was measured on the beach, at what is known as Icy Bay, and from its ends the angles necessary for obtaining the elevation of several of the higher peaks in sight were measured. From these data it has been computed that Mt. St. Elias is 18,100 feet high, plus or minus a probable error of less than 100 feet. The summit of Mt. St. Elias is formed by a massive pyramid, on each side of which, as seen from the south, there is a prominent shoulder. The east shoulder, near its east end, has an elevation of 14,600 feet ; while the west shoulder, at its extremity, is 16,400 feet above the sea. The "visual height" of the mountain, as seen from the Malaspina glacier which skirts its southern base, is about 16,000 feet. This slope, of over three miles in vertical height, is one vast precipice down which the snow from near the summit descends in avalanches to the glacier at its base. The timber line in the St. Elias region is about 1500 feet, and the lower limit of perpetual snow between 2000 and 2500 feet, above the sea. Mt. St. Elias is 33 statute miles distant from the nearest point on the ocean shore, and its approximate position is : Latitude 60° 17′ 51″ N. ; Longitude 140° 55′ 30″ W. The observations and computations by which these results were obtained will soon be published in full in the *National Geographic Magazine.*

That Mt. St. Elias is the highest summit in North America seems to be beyond question, but this cannot be positively asserted until explorers have penetrated the region to the west of Copper River, where, about 100 miles north-west of Mt. Wrangell, a mountain is reported to exist, which is thought by the few white men who have seen it to rival St. Elias. The height of Mt. Wrangell is not accurately known, but is stated by Lieutenant H. T. Allen to be approximately 17,500 feet. In reference to the data from which these figures were derived, Lieutenant Allen says :—"The determination of the heights of these peaks [Mt. Wrangell and others] did not include the rotundity of the earth, but simply the solution of plane triangles, hence, cannot be accurate. Frequent compass bearings of them, taken as we descended the [Copper] river, also the vertical angles with the sextant from the same points, furnished the data for the determination of the height and position. A reasonable approximation is all that is claimed."[1] The height of the Orizaba, reported by Professor Heilprin, depends solely on measurements with aneroid barometers, and its probable error cannot be estimated. The highest point in the

[1] Reconnaissance in Alaska, 1885, p. 59.

Sierra Nevada is Mt. Whitney, in California, which, as determined by Professor S. P. Langley,[1] from a series of barometric measurements in connection with railroad surveys, is 14,522 feet above the sea. In the Rocky Mountains there is a large number of peaks over 14,000 feet high, as has been determined by many observers using various methods. The highest of these is thought to be Mt. Elbert, in Colorado, the elevation of which, as recently determined by Mr. Morris Bien of the United States Geological Survey, is 14,436 feet. In the Appalachian mountains the highest summit is Mt. Mitchell, in North Carolina; its elevation, as recently determined by engineer's level, is 6,707 feet. Mt. Washington, in the northern part of the same system, has an elevation of 6,293 feet, as shown by railroad surveys."

The Intercontinental Railway of America.—M. H. Guillaume has written to the *South American Journal* (Jan. 2), stating that the third corps of U. S. Engineers, which is making the surveys for this railway, has now entered Peru. The party under Mr. J. Imbrie Miller, the chief engineer, has worked for six months in Colombia and Ecuador, and, passing through Quito and Cuenca, arrived at Loja on October 14th. In Peru they will follow more or less closely the course of the Marañon (Upper Amazons) as far as Cerro de Pasco, and will then examine a route to Lake Titicaca, passing through Ayacucho and Cuzco. From the lake the route proposed runs through Bolivia to Jujuy, a terminus of the Argentine railways.

Venezuela and Colombia.—M. Chaffanjon, in a paper read before the Paris Society for Commercial Geography (*Bulletin*, Tome xiii. No. 4), has given a description of these countries and a narrative of the journeys he made there during the years 1889-91. Venezuela has about 750 miles of coast-line. From the mouth of the Essequibo to Guiria Point (known also as Cape Peñas), opposite Trinidad, the coast is low and sandy, whereas from this point westward to the Gulf of Maracaibo it is, in general, high and skirted by mountains rising in some places to a considerable elevation. The chief exports of the country are coffee, cocoa, and tobacco, cattle, copper and gold. Colombia is very favourably situated, possessing about 600 miles of coast on the Atlantic and nearly as much on the Pacific. Its harbours are, certainly, not very accessible, but Cartagena might be converted into a safe and important port. The coasts are low and dry, or else swampy. The Sierra Nevada produces excellent coffee and cocoa, and travellers speak very hopefully of its minerals. Gold, copper, nickel, mercury and coal have been found. In the neighbourhood of Lake Maracaibo and the peninsula of Coro coal is abundant, and rich springs of petroleum exist. At a distance from the coast the country consists of immense savannahs, on which grow here and there, like oases in the desert, clumps of the palms known in this part of America as *moriches*, which send down their roots perpendicularly into the soil, and by capillary action draw up the water to the surface, making the ground around them muddy and even dangerous. If from any cause these trees disappear, the soil soon becomes extremely arid. Large fortunes are made by cattle-grazing, and the cultivation of sugar is also an important industry, herdsmen eating as much as three or four pounds daily of a kind of loaf made of sugar. On the high plateaus wheat, oats, maize, and potatoes are grown. Caoutchouc and resins of various kinds may be collected in the forests.

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[1] Researches on solar heat. Professional papers of the United States Signal Service, No. 15, 1884, p. 194.

M. Chaffanjon made three journeys; the first from Guiria Point to the peninsula of Goajira; the second to explore the delta of the Orinoco and Guiana; and the third up the Magdalena River and nearly to the frontier of Ecuador. During the first journey he met with nothing worth relating, the country being quite civilized, until he came to Maracaibo. Not far from this town is a group of lagoons, where Indians of the Sanson and Goajiro tribes live in dwellings built on piles. These men bring their merchandise into Maracaibo to barter for hardware and textile goods. The Indians on the Goajira peninsula are far more distrustful of white men, though of late they have begun to trade a little with the towns. Heavy rains preventing excursions into the mountains, M. Chaffanjon was obliged to retrace his steps to Cumana, and thence pass through Maturin and Bolivar to El Callao on the Yuruari. This little village, five days' journey from Bolivar, has sprung up around a mine which has in some years yielded astonishing quantities of gold. In 1885 and 1886 the output was more than 20 million francs. M. Chaffanjon descended the Yuruari and the Cuyuni, coming to placers again on the lower course of the latter river. The country is rich in alluvial gold, and nuggets are occasionally found. Its possession has been for many years a question disputed between Great Britain and Venezuela.

Lastly, M. Chaffanjon spoke of his journey up the Magdalena. Near this river coal is found, and between it and the Rio Cauca are mines of gold of exceptional richness. The Magdalena is navigable from its mouth up to Neiva. At Honda M. Chaffanjon left the river and travelled on muleback to Bogotá, visiting afterwards Zipaguira, where are rich mines of rock salt, one of the chief sources of the Colombian revenue.

Tierra del Fuego.—The *Bol. dell Instituto Geogr. Argentino*, Tomo xii. Cuad. v. y vi., contains a description of this island by Dr. Polidoro A. Segers, who took part in an expedition in 1886, and since then has continued his observations during three consecutive years. The northern part of the island, explored by MM. Rousson and Willems, is covered with prairies, where no trees and few shrubs are to be found (see vol. vii. p. 536). To the south, however, of the line from Useless Bay to Cape Peñas the surface is clothed with forest, which gradually becomes more dense towards the south. Here the coast is more rugged and the shore is encumbered by rocks, harbouring large numbers of sea-fowl and a variety of molluscs. Fish also and seals are more abundant on the southern coasts. This difference in the animal kingdom causes a corresponding difference in the mode of life of the natives. Whereas in the north the Onas, or, according to Dr. Segers, Aonas, subsist on the guanaco and the *tucu-tucu*, a small rodent, the natives of the south, where these animals are seldom met with, are almost entirely dependent on the sea for their living. They catch seals with a decoy of seal-skin stuffed with grass, which they draw through the water by a thong, imitating at the same time to great perfection the bellow of the animal. Birds they catch at night by torch-light, letting themselves down the cliffs by ropes of leather, and fish they take in nets made of sinews of the guanaco. In their dress and customs the southern Onas resemble their brethren of the north, with whom they are constantly at feud. Their number, in consequence of frequent battles with their more numerous enemies, has been much reduced, and is now, probably, very small. They are very skilful in the use of the bow, and show some dexterity in the manufacture of arrow-heads of flint and glass and needles of bone, but they never make any improvements in their utensils and are utterly ignorant of art of the rude description generally found among savages. Tierra del Fuego is inhabited by six tribes of Onas, each of which speaks a particular dialect, though men of different tribes are able to converse

together. Each man has his distinctive name, wherein the Onas differ from the Yaghan, who live on the Beagle Channel, and go out in their canoes to sell otter and seal skins to passing vessels.

OBITUARY.

Bates, H. W., F.R.S.—We deeply regret to have to record the death from influenza, on the 16th February, of the accomplished Secretary of the Royal Geographical Society of London. He was a man of world-wide reputation as a naturalist. For twenty-seven years he filled the post of Assistant-Secretary to the Royal Geographical Society, during which time most of the leading explorers of the day "passed through his hands." He was also editor of the Society's *Proceedings*. Whether as an official, as a writer, or as a friend, Mr. Bates claimed the respect and the admiration of all classes. He brought to his work a singleness of purpose, exceptional tact, and a depth of insight which ensured the success of everything he undertook. His modesty and retiring disposition, added to a feebleness of health from which he suffered ever since his return from South America, were obstacles to any public display of his abilities, either as a writer or as an administrator: so that of recent years the name of Mr. Bates was familiar only to his more immediate circle of friends and to scientific readers.

Mr. Bates was born at Leicester on 2nd February 1825. At an early age he evinced a taste for natural history, and eventually his special study became that of entomology. To him is usually ascribed the discovery of the principle of mimicry in the animal world. When only twenty-three years of age he threw up a mercantile career, to which he was originally destined, being the son of a manufacturer, and accompanied his friend, Mr. A. R. Wallace, to the Amazons. Bates spent eleven years in the Tropical World he knew so well how to observe and describe, and he gathered rich collections. He returned to England in 1859, and four years later published his famous work, *The Naturalist on the Amazons*. Darwin's high estimate of the book and the man was well deserved.

We sympathise with our sister Society in the loss of so valued an official.

Grant, Colonel James A.—On Feb. 11th Colonel Grant died at Househill, Nairn. He was the son of the minister of Nairn, and was born in 1827. After being educated at the Grammar School of his native town, and at Marischal College, he obtained, in 1864, a commission in the Indian army, and served with credit during the Indian mutiny, and in the Abyssinian expedition of 1868. But his fame rests on the exploration of the Victoria Nyanza in 1862, when, in the company of Speke, Grant visited Uganda, and followed the Nile for some distance from the Victoria Nyanza, leaving to Sir Samuel Baker the task of tracing the river through the Albert Nyanza. Besides papers contributed to the Royal Geographical and Linnean Societies, Colonel Grant was also the author of a book entitled, *A Walk across Africa*. He was made a C.B. in 1866, and a Companion of the Order of the Star of India for his services in Abyssinia.

Junker, Dr. Wilhelm.—This well-known traveller was born at Moscow in 1840, and studied medicine in Gottingen, Berlin, and Prague. His first journey was to Iceland, and he also made a short tour in Tunis. His chief work, however, was carried out in the basin of the Nile, and in the region to the west of the Albert Nyanza. The Welle problem will always be associated with Dr. Junker's name. In 1883 Dr. Junker wished to return to Europe, but the Mahdi insurrection had closed the route to the north, and the king of Uganda refused to allow him to pass

through his territory. At last, in 1886, assisted by Emin Pasha, he made his way from the south-eastern shore of the Albert Nyanza to Zanzibar. In 1887 Dr. Junker visited Edinburgh, and read a paper before the Royal Scottish Geographical Society. His geniality and warm-heartedness won him friends in many countries, who will hear with deep regret of his death, which took place at St. Petersburg on February 13th. He gained the highest rank as an explorer.

Quatrefages de Bréau, J. L. A. de.—Born at Berthezème, in the Department of Gard, in the year 1810, M. de Quatrefages had almost completed his 82d year. He studied medicine in Strasbourg, and in 1838 was appointed Professor of Zoology in Toulouse. In 1850 he became a Professor at the Lycée Napoléon, and in 1885 Professor of Anatomy and Ethnology at the Musée d'Histoire Naturelle. He was a President of the Paris Geographical Society, and took a great interest in geographical work, but his special subjects were anthropology and ethnology. M. de Quatrefages has published a large number of works dealing with questions connected with these sciences, on which he was universally regarded as a leading authority. He died on January 12th.

MISCELLANEOUS.

During the year 1890 the trans-Atlantic steamers landed 470,782 passengers in the United States, of whom 371,593 were steerage passengers.

The Chancellor of the German Empire has granted a concession for a **railway from Tanga to Karogwe**, a distance of about 60 miles. It will be a single line of 1 mètre gauge.—*Revue Française et Exploration*, Feb. 1st, 1892.

The Population of Holland, according the census of 1890, was 4,511,415, or 359 to a square mile. Of these 2,228,487 are males, and 2,282,928 females.—*Deutsche Rundschau*, xiv. Jahrg. 4 Heft.

A large amount of valuable information concerning agriculture and commerce is contained in the **Summary of Consular Reports**, issued by the Emigrant's Information Office. We have received one of these small pamphlets, dealing with reports from America during the year 1891.

Professor George Davidson has written a pamphlet, published by the Geographical Society of the Pacific, on **The Discovery of Humboldt Bay, California**. He decides that the honour of the discovery is due to Captain Jonathan Winship, an American, who entered it in 1806, when in the service of the Russian American Company.

A decree has been published uniting the French possessions on the Guinea coast under one colonial government. The colony is to be called **Guinée française et dépendances**, and will be composed of French Guinea proper, now called Rivières du Sud, the settlements on the Ivory Coast, now styled Établissements de la Côte d'Or, and the settlements on the Bight of Benin.—*Le Tour du Monde, Nouvelles Géogr.*, January, 1892.

During the late revolution in Chile the Congressist party, when it had its centre at Iquique, found it necessary to seek the friendship of Bolivia. In consequence of promises then made a treaty has been signed, by which Bolivia recognises the sovereignty of Chile over the province of **Antofagasta**, but, in return, receives the right of free **transport of goods** through the port, and is permitted to establish custom-houses on her frontier, without any other restriction than those

enforced during the armistice of 1883.—*Revue Française et Exploration*, Feb. 1st, 1892.

The **Kew Bulletin of Miscellaneous Information** contains many interesting papers. In Nos. 53-54 is a very full account of the economic plants of the West Indies. No. 55 contains a short paper on African palm-oil, its extraction, adulteration, etc., and in No. 57 are to be found a number of letters on gutta-percha. It seems that all parts of the tree contain gum, and that for every pound collected by the Malays 37 lbs. are wasted. M. Eugene Sérullas claims to have discovered a satisfactory method of extracting the gum from the twigs, leaves, and bark. In general gutta-percha extracted by chemical processes is of little value owing to the resin it contains. Many experts also consider that these processes cannot be made to pay.

NEW BOOKS.

The Lake-Dwellings of Europe: being the Rhind Lectures in Archæology for 1888. By Robert Munro, M.A., M.D. Cassell and Co., 1890. Pp. xl. and 600.

Readers of Dr. Munro's interesting and exhaustive *Ancient Scottish Lake-Dwellings or Crannogs* (1882) must have wished that the author would take in hand to settle for them questions somewhat beyond his first subject: Where outside Scotland are lake-dwellings found, and in what do the ancient habitations of this species, native and foreign, agree and differ as regards construction, size, design, date, and contained traces of the life and manners of their occupants? The same idea must have occurred to the trustees of the Rhind Lectureship when they asked Dr. Munro to give this course of lectures on the Lake-Dwellings of Europe at large. To qualify himself for his task, Dr. Munro not merely studied the mass of miscellaneous literature in which much of the necessary information lay buried, but, accompanied by his wife, and at various times during two years, perambulated the whole of Central Europe, note-book and sketch-book in hand, visiting sites, exploring collections and museums, ransacking libraries, and everywhere picking up the information and developing the ideas which have found expression in this handsome volume. If at the beginning of his expeditions Dr. Munro could modestly say that he "had no special knowledge of lake-dwellings beyond Scotland," it is pretty certain that at the end of them he had a better all-round knowledge than any man living. Certainly there is no such book as Dr. Munro's—a comprehensive, concise, closely packed, and yet readable encyclopædia of all that needs to be known, or can at present be with good grounds asserted, on the wide and curious subject with which it deals. The numerous and excellent illustrations are well-chosen, most instructive, and though closely packed in groups are, like the letterpress, admirably printed.

The enormous mass of detailed information compressed into what was originally uttered in the form of six lectures, constitutes, in its present shape, a well-arranged book with a definite plan in six chapters. The method is to give first a general sketch of the way in which this particular branch of archæological study had attention called to it, and to specify the early results—summed up in Keller's reports. The stations on the Lakes of Zürich, Neuchâtel, Bienne, Morat, Geneva, and other smaller lakes of Western Switzerland and Eastern France, as being the first explored, naturally come up next for notice—their situation, construction, peculiarity, and relics being very fully treated, with comments and conclusions.

Then come the lakes and morasses of Eastern Switzerland (including the Lake of Constance, which by the map is shown to have had some fifty stations within a short distance of its lower extremity), of the upper valley of the Danube, and of Carniola. The lake-dwellings of the Po valley and the artificial mounds elsewhere in Italy called *terremare* form the subject of the third chapter. La Tène, or the Lake of Neuchâtel, peculiar in the late date of its iron-age relics, leads to the outlying pile-dwellings on lake-shores and sea-shores, on the Rhine, and in Mecklenburg, Prussia, Western and Eastern, Poland, and Livonia, and to the *Terps* or mounds inside the sea-walls of Holland. The Irish and Scottish Crannogs, with notes of the traces of lacustrine habitation in Norfolk, Suffolk, London, North Wales, and Holderness are followed up by a discussion of the construction, character, date, and geographical distribution of the lake-dwellings in the United Kingdom, with the inferences to be made as to the occupants. The sixth and last chapter is the most readable, but, as more speculative, the most debateable—the general summing up of what we can know or guess as to the physique, pursuits, food, customs, arms, arts, tools, civilisation and date of the long-vanished lake-dwellers. To these conclusions contributions are made not merely by flint arrow-heads, jade axes, bronze weapons, tools, pots and pans, gold and other personal ornaments of almost imperishable materials; but, by such strangely preserved things as dried apples in halves, raisin-stones, hazel-nuts in jars, pieces of solidified grain masses showing the print of the sacking in which it was stored up, and a thousand things which but for the preservative influences of peat would have disappeared soon after the ancient savages who used them, and who may, authorities suppose, have lived as long as from three to four thousand years ago. Dr. Munro does not give us, as the author of *Realmah* does, the lives, conversations, tragic adventures, and deaths, of any particular lake-dwellers; but he tells us more of the *ménage* of many an ancient chief's eligible lake-residence than the head of the house himself (if a discreet gentleman) could ever have inquired into or known about.

When Dr. Munro is describing the actual remains of the pile-dwellings and classifying their contents, he is probably infallible and unassailable; but when any one hazards a conjecture as to the ethnography of the lake-dwellers and the migratory movements of the neolithic peoples, he may find it hard to prove his points, and may very possibly be wrong. We shall even venture to demur to two of Dr. Munro's conclusions—which are not, however, dogmatically put. He thinks the lake-dwellers of Central Europe were part of the first neolithic immigrants who entered Europe by the regions surrounding the Black Sea, and spread westwards up the Danube to Styria and Switzerland. But is there any ground for supposing that the neolithic Europeans came from Asia, or from anywhere? Is not Dr. Munro allowing himself here to be influenced by a ghost of the old-established theory of the Aryan migrations? Dr. Munro must be well aware that, following Benfey, Geiger, Penka, Schmidt, Schrader, and others, a steadily increasing number of scholars are giving up the Asiatic theory of the Aryans. And there are some reasons for accepting Pösche's view (in *Die Arier*, 1878), that the Aryan race had its first home in the great Rokitno swamp, between the Pripet, Dnieper, and Beresina; that thence waves from this stock found their way to Switzerland and the Po valley; that the lake-dwellers were all Aryans of some sort, and that in these regions there never has been any great displacement of races by conquest or immigration—the development from the stone age to that of the iron age having been carried on by substantially the same race (a view Dr. Munro explicitly rejects).

Dr. Munro's belief is that there are no remains of lake-dwellings east of a line from Trieste to Königsberg. But we know that since the glacial epoch the desic-

cation of lake areas in Russia, for example, has been very great; so that there may be fragmentary traces of lake-dwellings where neither lakes nor morasses to preserve them fairly intact are now found. Have the tumuli of the Dnieper country, numbers of which Ouvaroff (in *Récherches sur les Antiquités de la Russie Meridionale*, 1855) says seem to have served as basements of dwellings, been examined in this reference?

We are not disposed to deny that the Scottish and Irish crannogs were erected by Celts, though it is doubtful whether they needed to have had the making of what Dr. Munro calls their "fascine structures" (a term which suggests basket-work rather than oak piles), put into their heads by the pile-dwellings of their continental kin; and it is by no means certain that the crannogs were built by a weak conquered race seeking concealment—Dr. Munro's firm conviction. Would a Highlander plant an illicit still on an artificial island? An island, natural or artificial, is a good deal more conspicuous than most places on the shores of the loch or the recesses of an adjoining forest. The oldest of the great castles of Scotland, mainly Norman of the thirteenth century, were, in fact, crannogs. Messrs. M'Gibbon and Ross expressly testify that they are generally built on low boggy ground, and rely more on water than on lofty sites for security, not to speak of strongholds like Loch-an-Eilean and Loch-an-Dorb, on actual islands; such castles as those of Lochmaben and Carlaverock stand on low peninsulas made into islands by moats and ditches. But the builders of Carlaverock were not seeking concealment, surely, though on their artificial island they sought to increase their security. Probably the lake-dwellers were not very different from their neighbours who camped on isolated hills, convenient rocks, or other defensive spots on *terra firma*.

Why does Dr. Munro prefer *Allemannish* and *Slavish* to the usual English equivalents? If he says *Livland*, he should say *Polen*; and the Polish spelling for Cracow, which Dr. Munro adopts, is not better than the familiar English form. There are very few misprints: two or three (*revêt*, *revêtent*, for participles) in the French of page 510; *Statistick* on p. 514; *Bulletino Paletnologia* without *di* on pp. 251, 583; *mariniere* on p. 242 spelt *marnière* and *marière* (250); *am* for *an* (568); *acht* for *achte* (572); *Hœpli* for *Hœpli* (581)—most of them in the full and carefully-prepared bibliography.

With so much matter to digest into six lectures, Dr. Munro did well to begin chronologically with Keller and 1854. But in the case of a second edition being required, it would be a gain if he were to name in his copious bibliography some of the earlier investigations and conjectures on the subject of the Swiss pile-timbers. It would not be irrelevant even to mention that Count Razoumovsky, in his *Histoire du Jorat et des Trois Lacs de Neufchâtel, Morat, et Bienne* (two volumes, Lausanne, 1789) devotes twenty pages to the discussion of the piles found in masses in the lakes; and distinguishes them, as *bois noirs aquatiques*, from fresh wood, and from *bois noirs fossiles* as regards their physical characters, combustibility, durability, availableness for cabinet-making, ship-building, etc., respectively. So great is the abundance of such wood that he regards it as a future source of revenue for the country, and sets about a course of experiments as to how, by artificial methods, the properties of the lake-piles might be communicated to fresh wood. Of the several "theories as to the origin" of the lake-wood, he thinks there may be some truth in them all, with *restrictions convenables*, including the theory of those who "pretendent que ces sont les débris des piliers et des ponts tombés dans l'eau;" but, of course, the worthy Razoumovsky had no notion of their real import, and his experiments are rather wide of Dr. Munro's scope.

Journeys in Persia and Kurdistan, including a Summer in the Upper Karun Region and a Visit to the Nestorian Rayahs. By Mrs. Bishop (Isabella L. Bird). Two volumes. London : John Murray, 1891. *Price* 24*s.*

Mrs. Bishop's book is a valuable and welcome addition to the bibliography of modern Persia. During the last thirty, or, to speak more correctly, during the last twenty-eight, years, Persia has been passing through a transition stage in its history, the final outcome of which, for better or for worse, it is difficult as yet to prognosticate. Until 1864, when the officers of the Indian Government first entered upon the task of connecting England with India by a line of telegraph traversing the Shah's dominions, Persia was in much the same condition, socially, economically, and politically, as it had been for centuries, and, latterly, was even more isolated from European influence than in the days of Shah Abbas the Great. Little or nothing had been changed but the ruling dynasty. There were neither roads, posts, nor telegraphs, and wheeled vehicles were almost unknown. Even in the capital half-a-dozen families represented the whole European population, besides the small *corps diplomatique* consisting of the members of the British, French, Russian, and Turkish Legations. Once, perhaps, in ten years a stray traveller passed through a corner of the country, to be stared at as a visitor from an unknown world. With the telegraph, however, came direct and constant contact with Europe and Europeans. The provinces were by its means brought much more immediately under the control of the Shah, who in his turn was, by the same means, gradually brought more and more under the influence of Europe. A fairly well organised post was established, and Persia, who had already for some years taken her place in the periodical Telegraph Conferences and Conventions, became a member of the International Postal Union as well. Roads began to be made in the neighbourhood of Tehran, where carriages and even tramways are now become as familiar objects as they are in Edinburgh. A not less striking change is perceptible in the habits and even in the dress and outward appearance of the upper classes, especially in the capital, whence the change is gradually but certainly spreading into the provinces. Concessions to European companies, perhaps more frequently a curse than a blessing to eastern States, are in vogue. Germany, Austria, Italy, and America have entered into permanent diplomatic relations with Persia, whose political situation has been further modified by the gigantic strides which Russia has made in her neighbourhood during the last twenty-five years.

No wonder, therefore, with so many influences at work, a period of change and transition has set in, the progress and phases of which form an interesting and important subject of study.

No more opportune time, therefore, could have been chosen for the enterprising journey which Mrs. Bishop describes to us in these volumes. Much had been expected from her facile and graphic pen, and we may at once say that those expectations are not disappointed. The audience which crowded the Free Assembly Hall at the opening meeting of the current session of the Royal Scottish Geographical Society have already had a foretaste of Mrs. Bishop's powers of keen observation and clear description, two of the most essential qualifications of a good traveller.

The form in which Mrs. Bishop's work appears is that of journal letters, regarding which the following explanation is given in the preface.

"The retention not only of the form, but of the reality, of diary letters is not altogether satisfactory either to the author or reader, for the author sacrifices the

literary and artistic arrangement of his materials, and, however ruthlessly omissions are made, the reader is apt to find himself involved in a multiplicity of minor details, treated in a fashion which he is inclined to term 'slipshod,' and to resent the egotism which persistently clings to familiar correspondence. Still even with all the disadvantages of this form of narrative, I think that letters are the best mode of placing the reader in the position of the traveller, and of enabling him to share, not only first impressions in their original vividness, and the interests and enjoyments of travelling, but the hardships, difficulties, and tedium which are their frequent accompaniments."

Among the phases of the present transition state of Persia to which we have alluded one of the most important is the recent opening of the Lower Karun to steam navigation, regarding which Mrs. Bishop, in a postscript to the first chapter of her book, makes some interesting and hopeful remarks. The Persians themselves appear to be taking a considerable share in the advantages which this new route is well calculated to yield. The formation of a native transport company, the "Nasiri," which has already, it seems, shown considerable enterprise, is in itself a hopeful sign, in reference to which Mrs. Bishop remarks, "I am strongly of opinion that if the (Persian) Empire is to have a solid and permanent resurrection it must be through the enterprise of Persians, aided, it may be, by foreign skill and capital, though the less of the latter that is employed the more hopefully I should regard the Persian future."

The first part of Mrs. Bishop's route, described in these volumes, was to Baghdad by river steamer from Busreh, and thence *viâ* Kermanshah and the holy city of Kūm to the capital, Tehran, which she somewhat fantastically prefers to spell Tihran. Unfortunately for her health and comfort, but fortunately perhaps for her readers, this portion of her journey was made in winter. The hardships and dangers of travelling at that season over the high exposed plains and rugged mountain passes of Central Persia are most graphically, and, as we can personally vouch from experience of them, most correctly described. The picture she draws of the toilsome struggles of the laden mules through the deep snowdrifts, and of the sufferings of man and beast from the intense cold of the icy blasts that sweep over those uplands, however exaggerated they may seem to those "who stay at home at ease," are true and exact as photographs.

There is an interesting chapter of Notes on Tehran, where Mrs. Bishop halted for much-wanted rest and sufficient time to give her some acquaintance with the *personnel* as well as with the methods of modern Persian Government, and its relations with the rapidly increasing European element in the capital.

From Tehran Mrs. Bishop went by Kūm and Kashan to Ispahan, following so far a part of the lines of the British Government Indo-European Telegraph, an institution on which the nature of our relations with Persia and the Persians has for the last twenty-eight years so much depended, and of which Mrs. Bishop gives a highly gratifying account. After describing the efficient system by which the lines and offices are maintained, and many hundreds of messages daily transmitted between England and India within an average delay of less than an hour-and-a-half, she adds :—

"The English staff, numbering from fifty to sixty men, is scattered along a line of 1900 miles. Some of them are married, and most occupy isolated positions so far as other Europeans are concerned. It is the universal testimony of Englishmen and Persians that the relations between them have been for many years of the most friendly character, full of goodwill and mutual friendly offices, and that the continual contact brought about by the nature of the duties of the electricians has been productive not of aversion and distrust, but of cordial appreciation on both sides."

The interesting city of Ispahan and its Armenian suburb of Julfa are pleasantly and accurately described. Here, as in fact throughout these volumes, one is struck with the keenness of her faculty of observation. Nothing worthy of note has escaped her, and everything observed is clearly and graphically described.

From Ispahan she entered upon her journey to the Upper Karun, a summarised account of which she has already given to the Royal Scottish Geographical Society (*vide* vol. viii. p. 1). The Karun and Bakhtiari chapters form one of the largest and most interesting sections of Mrs. Bishop's work.

Emerging from Luristan she visited the naturally important trade-centre of Burnjird, and travelled thence *viâ* Hamadan into the heart of Persian Kurdistan, a region rarely seen by Europeans.

Some extremely interesting chapters follow on Urmi (or Urumiah, by which form it is perhaps better known), with its Nestorian Christian inhabitants and English and American missionaries. Her remarks on the future of Christianity in Persia and the wisdom or the lack of it in the efforts of the Missionaries to engraft a western on an eastern form of it will be read with much interest.

From Persian, she passed into Turkish, Kurdistan, and visited Van and Bitlis. Like all travellers who have preceded her in those regions she bears ample testimony to the noble self-sacrificing lives led by the American Missionaries of both sexes.

From Bitlis to Trebizond, *viâ* Erzerum, is the last portion of Mrs. Bishop's adventurous journey described in these volumes. Here, of course, she was on ground less unfamiliar than the mountains of Kurdistan and the valley of the Karun, but her narrative is none the less interesting on that account.

So many books are published now-a-days either in bad type or of unwieldy form, that the excellent manner in which these handy volumes are got up is not unworthy of remark. R. M. S.

My Mission to Abyssinia. By Gerald H. Portal, C.B., H.B.M. Agent and Consul-General at Zanzibar. With Map and Illustrations. London: Edward Arnold, 1892. Pp. 261.

Mr. Portal recounts in this volume the experiences and the result of the diplomatic mission which he led into Abyssinia in 1887-8, the object of which was to mediate between the Negus and Italy, whose forces were on the verge of an arduous campaign, owing to the determination of Italy to avenge the massacre of her troops at Dogali. His mission was a secret one; but it was almost hopeless from the start: owing to the force of circumstances, it was rendered nugatory. In the first place the forces of Abyssinia and Italy were already drawn up in battle-array, each side eager for the arbitrament of arms; secondly, Mr. Portal had only a few months to perform a most difficult journey and a still more difficult mission; and thirdly, the dispute between Italy and Abyssinia was based on utterly irreconcilable claims. That the rival armies did not eventually meet in a conflict which must have been disastrous to both was due to the sudden death of King Johannis, who expired from a wound received in a battle with the Mahdiists, and to that of his son. There being no direct heir to the throne, the kingdom of Abyssinia was plunged into a civil war. Menelik of Shoa, having defeated his rivals, seized the throne. His candidateship had been materially supported by Italy; consequently Italy found no difficulty in subsequently extending, not only the bounds of her colony of Eritrea, but even her sphere of influence over Abyssinia itself. Italy, as we know, has since then retired from her equivocal and untenable position, and Abyssinia is still broken up in factions and may, perhaps, never regain her autonomy.

To turn to Mr. Portal and his enterprising journey. After overcoming obstacles that might have thwarted a less capable leader, he eventually succeeded in outwitting Ras Alula and in gaining the King's camp. The letters which he presented from Queen Victoria and Lord Salisbury did not succeed in moving King Johannis from the position which he had taken up ; so that the mission was practically fruitless, beyond causing a delay in the outbreak of hostilities.

The greater part of the book is occupied by a detailed account of the experiences of the mission whilst on the march. Every member of the expedition behaved with exemplary zeal, though the three Europeans were left to do most of the hard work. Their hairbreadth escapes, their sufferings from privation and thirst, and their indomitable pluck are all recorded in this interesting volume. Mr. Portal does not claim any geographical results from his expedition ; incidentally it may help one to realise the immense difficulty of influencing, and far more of controlling, the passions of a war-like, half-civilised people like the Abyssinians, whose mountain-home is all but impregnable.

A Transatlantic Holiday ; or, Notes of a Visit to the Eastern States of America. By T. Fitzpatrick, M.A. London : Sampson Low, Marston, and Co., 1891. Pp. viii + 210. *Price* 10*s.* 6*d.*

These pages contain a narrative of the author's personal experiences during a tour in the United States, and a few remarks on the cities he visited—New York, Boston, Washington, and Philadelphia. The printer has done his part well, but the illustrations are of a very ordinary description.

A Winter Cruise in Summer Seas. By Charles C. Atchison. London : Sampson Low and Co., 1891. Pp. 369. *Price* 16*s.*

The author describes his book as a "diary of a two months' voyage on the Royal Mail Steam Packet Company's s.s. *Clyde* from Southampton, through the Brazils, to Buenos Ayres, and back, for £100." The object of his journey was to "find health ;" but if one may judge from the high spirits displayed in every page, from cover to cover, his health would appear at no time to have been seriously impaired. The book is written in the humorous vein, and it is not often that the average reader can tolerate this style ; but it must be confessed that Mr. Atchison is never dull, never vulgar, and never tedious. If his humour is occasionally forced, it is no less than is to be expected. His bright description of life at sea and of his experiences on shore are eminently readable, and may tempt others to follow in his wake. He describes at some length the various ports at which he touched. The numerous illustrations are artistically executed.

Aus dem Kaukasus. Von C. Hahn. Leipzig : Verlag von Duncker und Humblot, 1892. Pp. 299. *Price M.* 6.

This is a collection of essays on various subjects connected with the Caucasus. The first chapter deals with the history of the various races that inhabit, or have inhabited, the country—the Iberians, Albanians, Colchians, etc.—and is compiled from classical writers. There is little in this chapter that is not within the reach of readers of modern languages, the same extracts having already been collected in several works. Passing on to the area and present population, we were much surprised at finding such want of exactness. To give the area as 10,000 square miles (German), and the population as seven millions is rather too loose, when more accurate official information is published in most European languages. The author

might have consulted General Stebnitski's tables, or those in the *Kavkazky Kalendar*, published at Tiflis, where he himself resides. Nor are his estimates of the various races always reconcilable with the numbers given in that publication, even after allowance has been made for differences in subdivision. The latter part of the book, in which Herr Hahn relates his experiences during tours in the mountains, and describes the customs and peculiarities of the inhabitants, is far more interesting and valuable. Herr Hahn, during his residence in Trans-Caucasia, has acquired a knowledge of the languages which would give him in such researches a great advantage over most European travellers. His remarks, therefore, on the Ossetes, Pshavs, Khevsurs, and other tribes are very acceptable to the ethnologist, and where he differs even from such an authority as Dr. Radde, his opinion is worthy of respect. A map of the country the author explored ought to have been given.

The New Era in Russia. By CHARLES A. DE ARNAUD. London: Gay and Bird. N.D. Pp. 166. *Price* 2*s.* 6*d.*

M. de Arnaud might hold a brief from the Russian Government, so favourably does he represent the acts of the Tsars and their advisers. But his enthusiasm oversteps the mark, and prompts him to such extravagant statements that the reader is inclined to doubt the accuracy even of those passages which most accord with his own views. According to M. de Arnaud, Nihilism was confined to the petty nobility, who feared the effect of the liberal measures of the Government on their revenues, and has now died out in Russia, the people, with the exception of a very small minority, being perfectly content to live under the present despotism. He considers that arrest and punishment by "Administrative Process" may fairly be compared with the execution of justice during a suspension of the *Habeas Corpus* Act. The Jews, he says, have simply been distributed at points remoter from the frontier, because of their smuggling propensities. "There is no country in the world where there is greater religious freedom than in Russia." No doubt M. de Arnaud would as plausibly explain away the late deportation of Stundists to the Caucasus. We have reserved the most extraordinary assertion for the last. It is that Alexander II. "accomplished at one stroke for the Russian people what it took the Anglo-Saxon race centuries to effect—the elevation of the masses to freedom and the establishment of political rights among the lately enslaved." The author evidently does not understand what it is that the Anglo-Saxon race has accomplished during these centuries. Alexander II. was a benevolent and enlightened ruler, but he could not work miracles.

The Australian at Home. By EDWARD KINGLAKE. London: The Leadenhall Press. Pp. 159.

Mr. Kinglake evidently writes with much knowledge of his Australian compatriots; but it would have been better if his book had been more systematically arranged, less discursive, and more condensed. We are glad to learn that the idea of severing Australia from the mother-country is not popular among the Australians. At the same time, the author points out the ignorance and indifference shown in Britain regarding Australia and her people. It is curious to read that in Australia, with all its modern improvements, "the cost of law-suits is tremendous." Occasionally barristers and solicitors are amalgamated, but the expenses remain the same. Lawyers flourish in Melbourne and Sydney. Doctors also make money, for typhoid fever ravages the towns on account of their insanitary conditions. Society in Australia takes its tone from London, and Australians resemble Americans only

in very slight and trivial points. The author particularly advises none to settle in Australia without having a particular line of business, friends, or capital.

Illahun, Kahun, and Gurob, 1889-90. By W. M. Flinders-Petrie, with Chapters by Professor Sayce, D.D., Professor Mahaffy, Canon Hicks, F. Ll. Griffith, B.A., and F. C. J. Spurrell, F.G.S. London: David Nutt, 1891. Pp. 59, and Plates xxxiii.

Mr. Flinders-Petrie, whose name is so familiar in connection with his work for the Egyptian Exploration Fund, has published in the present volume the results of excavations undertaken by private enterprise at Illahun, Kahun, and Gurob. The numerous illustrations—which indeed exceed the bulk of the text—include a sketch-map of ancient sites in the Fayum, and a plan of the city of Kahun. The latter has a special interest in being the first Egyptian town that has been excavated in its entirety, and bearing traces, moreover, of its design by a single architect on a regular system. Pyramids and tombs, pottery and carving, tools, weapons, and ornaments—in short, all the characteristic "finds" to be expected in this region —are fully described and richly illustrated. Professors Sayce and Mahaffy have contributed a chapter on the Greek papyri, which include literary fragments, private and municipal accounts and law papers; Canon Hicks has given his special attention to the Ptolemaic inscription; and Mr. Griffith describes the contents of the hieratic papyri, consisting of official documents, scientific, literary, and religious works. Lastly, the stone implements and their uses are treated with the completeness of a specialist by Mr. Spurrell.

Africa Rediviva, or the Occupation of Africa by Christian Missionaries of Europe and America. By Robert Needham Cust, LL.D. London: Elliot Stock, Pp. 118.

Dr. Cust has performed a serviceable task in the compilation of a map of Africa showing the extent to which the continent is occupied by Christian missions, and of detailed lists of the mission-stations. Not only the friends of missions, but geographers also, will be grateful for such a list; but, as the author is himself aware, a great deal of work is still necessary before we can regard the results of our present knowledge as even approximately accurate.

The remainder of the book is filled by a homily on the evangelisation of Africa and the comparative merits of missionary methods. Dr. Cust, in discussing these questions, claims to advocate wide and impartial views, but in effect they are the very reverse. He certainly has the courage of his convictions, and does not hesitate to express himself in vigorous, unequivocal language. His sincerity and his earnestness are conspicuous merits, deserving every commendation. But, in his zeal for reform, he does not pause to inquire whether geographical conditions and the teachings of history and experience lend support to, or militate against, his arguments. Such criticisms as he offers, therefore, cannot be expected to carry conviction with them, unless the reader should happen to hold similar views. Few will quarrel with such obvious conclusions as, for instance, that Roman Catholic and Protestant missions should not be established at the same localities (large towns excepted, of course); but that African missionaries should forswear marriage and live in brotherhoods, and that Christian missions should have no relations with commerce, are, among other such contentions by the author, subjects on which contrary opinions to his own are very widely held. We forbear to criticise this book in any detail—it opens up such a vista of controversy. We have only, in conclusion, to thank Dr. Cust for his attempt to delineate and describe the missionary

occupation of Africa. It is a subject on which Dr. Oppel (among others) has already written with conspicuous success ; but the ever-recurring changes and developments in missionary enterprise have necessarily rendered his treatise out of date.

The Negro Question ; or, Hints for the Physical Improvement of the Negro Race, with special reference to West Africa. By Joseph Renner Maxwell, M.A., B.C.L. (of Merton College, Oxford). London : T. Fisher Unwin, 1892. Pp. 188.

The author of this volume is a West African Negro, and has had the advantage of an English University education. He has acquired a certain facility of literary expression, but he has apparently not studied geography. He exhibits a most surprising ignorance of the peoples of Africa commonly classed under the generic name of Negroes, for, though his points are considered with special reference to West Africa, his inferences are intended to be of much wider application. His arguments—if they can be called arguments—are based on the erroneous assumption that all Negroes exhibit the same mental and moral attributes, and that these attributes are capable of assimilation with those of European or Asiatic races. In brief, he seeks to show that only by a process of legitimate miscegenation (the ultimate and logical course of which he, however, repudiates on pages 119 and 120) can the physical improvement of the Negro race be attained ; but he fails to see that, in the United States of America, miscegenation has been proved to be not only a failure but to all intents and purposes an impossibility. He advances the absurd proposition that the failures and sufferings of the Negro race are due to individual "ugliness," and that on that account the Negro is "despised." To a large extent the book is made up of lengthy quotations from the few English works bearing on the subject which he appears to have read. But for the most part his quotations are taken from Dr. Blyden's *Islam, Christianity, and the Negro Race.* Had he, however, read this admirable work with closer attention, he would have learnt that Dr. Blyden's opinion was that the Negro must develop an *original* culture, if he is ever to attain even the semblance of what Western nations regard as civilisation. With Dr. Blyden's verdict we wholly agree ; but past history and present prospects point to a very remote period of time before the Negro race can hope, as a race, to stand on the same platform as their Caucasian brethren, individual exceptions notwithstanding.

Oliver & Boyd's Edinburgh Almanac and National Repository for the year 1892. Edinburgh : Oliver & Boyd. Pp. 1195. *Price* 6*s.* 6*d.*

The familiar and ever-welcome *Oliver & Boyd* has been issued for the current year, and bears all those evidences of thoroughness in treatment, correctness in detail, and far-reaching scope which have for so many years made it the Scotsman's oracle. The present volume contains several new features of utility and interest, among which may be mentioned the recently passed Stamp Act, and other statutes particularly affecting Scotland ; returns of the late census, so far as these are at present available ; valuable official information regarding the present financial relations of England, Scotland, and Ireland ; and a curious table of precedence as observed in Scotland. There are also useful county lists in addition to the varied and better-known matter included in former volumes. Too much could hardly be said in praise of this hand-book ; but its contents are too familiar and its utility too widely recognised to make any further recommendation necessary in this place.

An Almanack for the year of Our Lord 1892. By Joseph Whitaker, F.S.A. London. Pp. 728.

Every year some additions are made to this useful book of reference. The number of pages is increased this year, partly by the enlargement of the sections, and partly by entirely new matter, such as articles on *Agricultural Education*, *Our Present Ocean Mail*, etc. We do not wish to complain of the quantity of information given us in the pages of the *Almanack*, which has been of great service to us, but, as the line must be drawn somewhere, we would suggest that statistics of colonies and foreign countries should be left for the *Statesman's* and *Colonial Year-Books*. More space would thus be left for matter relating to our own islands, and the difficulties of rendering the work complete, of which the editor speaks in his *Advertisement*, would be diminished by this limitation.

Hazell's Annual for 1892: *A Cyclopædic Record of Men and Topics of the Day.* London: Hazell, Watson, and Viney, Ld., 1892. Pp. 726. *Price* 3*s.* 6*d.*

This *Annual* is so well known that it is unnecessary to enter into many details respecting the present edition. As far as we have been able to test it, the latest information has been collected. Social topics, education, and biography are among the leading themes. In such books a yearly increase of bulk is, perhaps, unavoidable, but in this case it amounts to some twenty pages only.

Barker's Facts and Figures for the Year 1892. Edited by Thomas P. Whittaker. London and New York: Frederick Warne and Co. Pp. 384. *Price* 1*s.*

The second issue of this useful hand-book contains much new matter and several improvements in scope and arrangement. Complete accuracy can hardly be looked for in such a collection, but, so far as we have been able to test the contents, the facts appear to be well-nigh absolutely correct, and the errors we have noticed among the figures are possibly printer's mistakes or slips of the pen. The editor deserves great praise for the completeness of the collection, and, upon the whole, for the arrangement of the rubric. Many of the contents of the volume cannot easily be found elsewhere in handy reference form; and we can heartily recommend the production as a valuable desk or library companion.

North Wales. Part II. By M. J. Baddeley, B.A. and C. S. Ward, M.A. Third Edition, revised. "Thorough Guide Series." London: Dulau and Co., 1891. Pp. xvi + 147. *Price* 2*s.* 6*d.*

The usefulness of these handy guides is attested by the fact that many of them have passed through several editions. The second part of North Wales takes in the country from Ruabon and Bala, in the north, to Aberystwyth and the Devil's Bridge, in the south. It has been brought down to date, and is furnished with ten maps and plans by Messrs. Bartholomew.

Lochnagar. By Alex. Inkson M'Connochie. Aberdeen: D. Wyllie & Son. 1891. *Price* 1*s.*

The mountain scenery of Balmoral, long known to the readers of Byron, and now intimately associated with the domestic life of Queen Victoria, claims the attention of the man of science, the artist, and the society journalist. The map and minute description in this last of Mr. M'Connochie's guide-books will be of great value to all these. We have nothing but good to say of it, unless a suggestion of more care in proof-correction, for fear of the presence of less evident mistakes than the claim of the power of "*pot* and gallows" for Gordon of Abergeldie.

Handbook to the Geology of Derbyshire. By Rev. J. Mageno Mello, M.A., F.G.S. 2d Edition. London: Bemrose and Sons, 1891. Pp. 89.

To this new edition of his excellent little handbook Mr. Mello has made several interesting and important additions. He gives us the data supplied by Mr. Deeley's examination of the Pleistocene deposits of the Trent basin, and also the results of his own exploration of the Creswell caves, which were found to contain numerous remains of Pleistocene animals and the instruments of palæolithic man. The book is well illustrated with a geological map of Derbyshire, geological sections, and a plate showing typical specimens from the Creswell caves.

NEW MAPS.

ASIA.

INDIA.

General Maps.

INDIA, with hills, in 4 sheets (with additions to railways up to January 1890). Scale, 1 : 4,055,040, or 64 miles to 1 inch.

INDIA, Revised Map of ——, in 6 sheets (corrected to 1888, 2d edition). Scale, 1 : 2,027,520, or 32 miles to 1 inch.

AFGHANISTAN, Map of ——, in 4 sheets, 1889. Scale, 1 : 1,520,640, or 24 miles to 1 inch.

BALUCHISTAN AND SINDH FRONTIER, Skeleton Map of ——, with additions to Boundary and corrections to Railway up to 1891. Scale, 1 : 2,027,520, or 32 miles to 1 inch.

ANDAMAN ISLAND, Sheets, Nos. 1, 2, 9, and 10 in one, 1890. Scale, 1 : 253,440, or 4 miles to 1 inch.

Statistical Maps.

INDIA, Telegraph Map of ——, in 6 sheets, 1889. Scale, 1 : 2,027,520, or 32 miles to 1 inch.

INDIA, Military Map of ——, in 6 sheets (corrected to 1888). Scale, 1 : 2,027,520, or 32 miles to 1 inch.

INDIA, illustrating the Gauges of Railways (corrected to June 1890). Scale, 1 : 6,082,560, or 96 miles to 1 inch.

INDIA, Skeleton Railway Map of ——, in 2 sheets, 1890. 2d edition. Scale, 1 : 4,055,040, or 64 miles to 1 inch.

INDIA, Shaded Railway Map of ——, in 2 sheets, brought up to March 1890. Scale, 1 : 4,055,040, or 64 miles to one inch.

INDIA, Skeleton Railway Map of ——, in 4 sheets, 1890. Scale, 1 : 3,041,280, or 48 miles to 1 inch.

INDIA, Shaded Railway Map of ——, in 4 sheets, brought up to March 1890. Scale, 1 : 3,041,280, or 48 miles to 1 inch.

Provincial Maps.

BOMBAY PRESIDENCY, Map of the ——, 1890. Scale, 1 : 2,027,520, or 32 miles to 1 inch.

MADRAS PRESIDENCY, Map of the ——, with additions to Railways up to August 1890. Scale, 1 : 2,027,520, or 32 miles to 1 inch.

NORTH-WESTERN PROVINCES AND OUDH, Map of ——. (Corrected up to March 1890.) Scale, 1 : 2,027,520, or 32 miles to 1 inch.

PUNJAB, Map of the ——, in 4 sheets (with additions to Boundaries and Railways up to March 1890). Scale, 1 : 1,013,760, or 16 miles to 1 inch.

PUNJAB, Skeleton Map of the ——, and surrounding Countries (with additions and corrections to January 1890). Scale, 1 : 2,027,520, or 32 miles to 1 inch.

MYSORE, Map of ——. Preliminary edition (with additions to Railways, and corrections to Boundaries to January 1890). Scale, 1 : 1,013,760, or 16 miles to 1 inch.

UPPER BURMA, Preliminary Map of ——. 5th edition. Scale, 1 : 1,013,760, or 16 miles to 1 inch.

ATLAS OF INDIA.

Quarter Sheet—No. 13 N.W. (with additions to 1890).
„ „ „ 15 N.W. 1889.
„ „ „ 21 S.W. 1890.
„ „ „ 50 S.E. 1889.
„ „ „ 60 N.W. (with additions to 1890).
Full Sheet „ 15 (with additions to 1890).
Scale, 1 : 253,440, or 4 miles to 1 inch. *30th June* 1891.

TIBET, Traversée du ——, par G. Bonvalot et le Prince Henri d'Orléans. Juillet 1889—Septembre 1890. Echelle, 1 : 2,650,000.

Bulletin de la Société de Géographie, 1891, 3^e^ *Trimestre.*

THE PAMIR, showing Mr. Littledale's Route. Scale, 1 : 2,027,520.

Proceedings of the Royal Geographical Society, January 1892.

AFRICA.

BUKOBA NACH KARAGWE, Karte der Reise von Emin Pascha und Dr. Stuhlmann von ——, im Febuar 1891. Construirt von Dr. von Danckelmann. Massstab, 1 : 300,000.

Mitt. v. Forsch. Reisenden a. d. Deut. Schutzgebieten, 1891, *Heft.* 5.

GARENGANZE, Maps to illustrate a journey to ——. By Alfred Sharpe. Scale, 1 : 2,027,520.

Proceedings of the Royal Geographical Society, January 1892.

OCEANIA.

GOGOL FLUSSES (KAISER-WILHELMS-LAND), Skizze des ——. Von Dr. C. Lauterbach. Massstab, 1 : 100,000.

Nachr. über Kaiser-Wilhelms-Land, 1891, *Heft* 1.

NEW PHOTOGRAPHS.

ALASKA, Fourteen photographs taken during the expedition sent by the National Geographic Society and the U.S. Geological Survey to ——. Presented by Israel C. Russell, Esq., of the U.S. Geological Survey.

NEW YORK. Ten photographs taken during the construction of the Spuyten Duvyil Creek Railway. Presented by Jos. J. Henderson, Esq., C.E., New York.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

JAPANESE CHARACTERISTICS.

By Professor C. G. Knott, D.Sc., F.R.S.E.

(Read at Meetings of the Society at Edinburgh, Glasgow, Dundee, and Aberdeen, in February and March.)

To describe the characteristics of an alien race is a difficult task. There is apt to be a lack of perspective in the delineation, a want of balance in the colouring. What is novel to the observer is exaggerated unduly; and, in the straining after contrasts, the representation degenerates not seldom into a caricature. In regard to Japan this is particularly true. The visitor who speeds through the country as one moon waxes and wanes talks of Japanese ways of life and habits of thought with a certainty and an assurance which the resident of ten years' standing cannot attain to. The more we mix with this most interesting of oriental peoples, the less we seem to know of them, the more difficult we find it to hit off their characteristics in a few brief sentences. The following paper is an attempt to give the impressions gathered during eight years' experience of Japanese life. If the result be only to correct certain exaggerated views that have wide currency, I shall feel that the paper has accomplished one good end. It will be noticed that nothing technical has been enlarged upon. For example, I have considered only the significance of the artistic feeling in its relations to every-day life, and have left untouched the art itself. In brief, the characteristics here spoken of refer almost entirely to the national *character*, intellectual, moral, and emotional, as it now exists, and as it has been developed in its historic setting. A short historic introduction does not seem out of place.

The Empire of Japan, like the Kingdom of Scotland, is inhabited by two distinct races speaking distinct languages. Of these the Ainu is the older, and must, from lack of earlier historic information, be regarded

as the primitive or indigenous race. The Japanese were invaders, although in their own mythology there is no distinct recognition of this fact, which must have happened before the national memory had awakened. The evidence that the Ainu occupied the land is threefold. First of all, Ainu, at present found no further south than the Island of Yezo, have within historic times lived in the north of the main island. Then, secondly, Von Schrenck has shown, in his great work on *Amur Land*, that all over the north-eastern parts of Asia numberless isolated tribes live, each speaking a different language. These are the fragments of earlier races, which have gradually been pushed into the holes and corners of this old-world region by the pressure of younger and stronger races surging ever eastwards. The Ainu is one of these remnants; and it is possible that the struggle between the Ainu and Japanese may have begun when both races inhabited the continent. That the old cave-dwellers and shell-heap architects of Japan were really the Ainu we have no evidence at all. Nor have we evidence that they were not—except that no Ainu lives in a cave now, and that in certain Ainu myths we have mention of dwarfs. Finally, we have the remarkable evidence, first brought forward by Professor Chamberlain, that many Japanese place-names are of Ainu origin.

So familiar is this explanation of place-names to us English-speaking residents of a once Celtic country that we might easily fail to see the full significance of its application to the Ainu-Japanese problem. We know from history that the pure Celt was our predecessor in this land; and long before philology had birth many names were recognised as Celtic and understood in their Celtic sense. But, until within the last few years, it had never entered the Japanese imagination that he was originally an alien to the soil on which he stood. Was he not with all his kin the direct descendant of the divine beings Izanagi and Izanami, from whom also by ordinary generation the whole Japanese archipelago was produced? The first human Emperor of Japan—the great Jimmu Tennō—was he not only four generations removed from the Sun-goddess, herself a child of the august pair of deities just mentioned? True, the better-educated Japanese of to-day ignore the legends of the gods and are content to begin with Jimmu Tennō himself. Still, the fact remains that there is no distinct suggestion in these myths of the race having ever occupied other territory than the islands of Japan. All names in Japan are therefore presumably of Japanese origin, except in such regions, possibly, as are known to have been inhabited by the Ainu.

Now, in making this search after Ainu-derived names, Professor Chamberlain could get absolutely no assistance from the Japanese themselves. Every place-name in Japan is represented by a combination of Chinese characters or ideographs. Beyond the significance of these the Japanese cannot get. Ask him what the name meant originally. He will point to the characters, quite heedless of the probability, in some cases the absolute certainty, that the name existed as such long before the introduction of letters, long before a Japanese eye had gazed on an ideograph. To illustrate the process, and at the same time to show how misleading Japanese philological methods are, take a concrete example.

Back in the darkness of the unlettered past an Ainu community is settled by the banks of a stream. This by way of distinction they call *To-nai*, or "stream with the lake." Japanese strangers come in among them, few at first, no doubt, and perhaps friendly enough. Gradually, however, the superiority of the new comers tells; and the Ainu reluctantly seeks other haunts. But the name *To-nai* stays behind in the slightly disguised Japanese form *Tonami*. Centuries slip past until civilisation and letters come hand in hand from China. The Japanese schoolmaster is now abroad, and every name of importance must be cast in a Chinese mould. The priest and soothsayer lend their aid, and evolve a pleasing combination of lucky ideographs, phonetically identical with *Tonami*. In its written form, and to the Japanese eye, the name means "hares in a row;" how such a title could come to be applied to an insignificant village may be left to the ingenious to solve. Other examples might be given; but I shall content myself with two. Tsushima, the island which lies between Korea and Japan, is represented by two characters meaning "opposite horses." Professor Chamberlain regards it as a Japanese corruption of the Ainu *tuima* "distant." The Japanese always introduces the *s* sound between *t* and *u*, and dislikes certain diphthongs—hence from *tu-i-ma* comes *tsu-shi-ma*. The Rev. Mr. Bachelor, following up this theory, has given a most plausible derivation of Fujisan, the peerless mountain of Japan and one of the most frequent objects in pictorial decorations. It rises, an almost perfect cone, to a height of 12,400 feet above the sea. It is a dormant volcano, hardly extinct. The Japanese write its name "the mountain of wealth." But there is an Ainu word *Huchi*, which in a Japanese mouth would almost certainly become *Fuji*, and which means the Goddess of Fire—a very appropriate name indeed for a lofty burning mountain.

Our first conclusion then is, that the Japanese are not aboriginal on the soil they now possess. Like ourselves they passed over from a large continent to a small island, and there, in partial isolation, they began to develop their national characteristics. Exactly where they came from we know not; exactly what other race they are most nearly akin to is a problem still awaiting solution. The language is structurally similar to the Korean and Manchurian languages: but it is entirely dissimilar to the literary Chinese. It abounds in Chinese derivations, as our English does in Latin. But it was no mere borrowing that gave the Japanese their literary language—it was absorption, assimilation.

The Japanese, as we are all aware, have often been characterised as the most imitative of peoples. In this connection the imitative faculty is mentioned in rather a deprecatory way, as if we of the West were so very original. Nevertheless, historically, Japan has not been a greater borrower from her neighbours than were our barbarian ancestors when they got their religion from Judah, their philosophy from Greece, and their law from Rome. Civilisation came to the Japanese in the wake of the Buddhist missionaries, somewhere about the year 600 A.D. This was the first great event in their national development. Till then they were warlike savages, skilled possibly in the making of a rude pottery, but utterly unlettered. The *Kojiki*, or "Records of Ancient Matters," containing the

legends of the gods and the so-called histories of the earlier Emperors, was not written till 712 A.D.; and, although there may be much truth in the traditions that were embodied in that first record, it is impossible to give credence to dates and events earlier than the 5th century. The conquest of Korea by the warrior Empress Jingō in 200 A.D. is altogether fabulous, although there is no reason to doubt that a queen of that name existed. There is ample evidence that in these early centuries there was no distinct political unity amongst the various Japanese clans. It was only about the eighth century that a centralised government began to be formed. The Emperor, or Son of Heaven (*O Tenshi Sama*), as he is styled to this day, was theoretically absolute. But practically he very soon became a puppet in the hands of some powerful nobleman, who ruled the country in his name. From the eleventh to the sixteenth century there was a continual struggle for supremacy between the more powerful clans; and just at the time of the discovery of the country by the Portuguese (1542 A.D.) Japan was in a state of chaos.

And now came the second great event of Japanese history—the consolidation of the empire through the successive labours of three great men, Nobunaga, Hideyoshi, and Ieyasu. The second of these, Hideyoshi, has been called the Napoleon of Japan. He reduced the country to complete subjection, always of course in the name of his Most Sacred Majesty the Son of Heaven, and brought his brilliant career to a fitting climax by his conquest of Korea in 1598. On his death, Tokugawa Ieyasu promptly seized the reins of government, quelled the insubordination of the other barons, partly by able generalship, partly by astute diplomacy, and received from the Imperial Court of Kyōto the historic title of *Shogun* or Generalissimo. He established his own court at Yedo (now Tokyo), which thenceforth became the real capital of Japan. Ieyasu gave to Japan its final form of feudalism, which, perfected by his grandson Iemitsu, lasted down to the year 1868. In almost perfect isolation, and free from internal troubles of any magnitude, the people of Japan lived for two and a half centuries, evolving their exquisite art and their elaborate etiquette.

There is always a profound relation between a nation's history and a nation's character, and to appreciate the one we must know something of the other. Now Japan is unique among nations as regards certain periods of her life-history. Small wonder then that she is unique in regard to certain of her characteristics. Let us try to imagine the peculiar condition of affairs at the time when Ieyasu and Iemitsu determined on a policy of isolation. Under Hideyoshi the military genius of the people had risen to its high-water mark. Ieyasu had no sooner established himself as *Shogun* than he issued a decree of expulsion against the Portuguese and other European missionaries. This was carried largely into effect in 1614, and under Iemitsu Japan entered upon her policy of rigorous seclusion, Nagasaki being the only port at which slight contact with the outer world was maintained. Thus, at the beginning of her two and a half centuries of isolation, Japan had proved herself victorious in the East, and able to cope with the powers of the West. She, so to speak, retired from the strife of nations with the victor's wreath upon her brow.

Conjoin to this the peculiar features of her feudalism—filial piety and fealty carried sometimes to extravagant lengths—and we have much that throws light on the Japanese character.

Do we not here find at once a perfect explanation of that self-reliance, self-sufficiency, or "conceit," which many visitors to the Land of the Rising Sun animadvert upon? It would indeed be a matter of surprise if the Japanese did not possess this "canty conceit o' theirsel's," which is certainly not a monopoly of the Orient. It is one of the traits which go to the making of a great nation. It usually betokens independence of character; and we do not need to sojourn long in Japan before we have ample evidence that down to the lowest ranks the Japanese do indeed possess this valuable quality. There is no real servility in all their politeness; there is not, or at least there was not till recently, any of that spirit which is the essence of "snobbery." The reason of this is not far to seek. It is to be found in that 250 years' training in Ieyasu's school of feudalism. The broad characteristics of Japan's later feudalism may be described in a few sentences. The *Mikado*, too sacred to be gazed upon by the public eye, was theoretically absolute. The *Shogun's* attitude towards the *Mikado* was one of reverential homage; his duty was to strengthen the imperial supremacy. Theoretically on an equality with the *Shogun*, but practically under him, were the *Daimyo*, or territorial barons. These farmed out their territories to their *Samurai*[1] vassals in return for military service. In the larger daimyates, subinfeudation existed, the more powerful *Samurai* having their own vassals or *Samurai* of lower degree. The *Daimyo* and his *Samurai* lived in a walled town, the artisans and merchants living outside the walls, and the agriculturist further afield. These last-named classes of society were collectively called *Heimin*, and formed practically a caste distinct from the *Samurai*. It is very important to bear in mind this broad distinction between the *Samurai* and the *Heimin*. Their codes of conduct and of honour, their ideas of life, and their religious notions were essentially different. The difference lingers to this day, so that the ordinary globe-trotter, who does little else than witness the out-door life of the present-day representatives of the *Heimin* class, can get no true idea of the feelings and life of the upper million. He may never meet a real lady of Japan at all, and he may meet the descendant of the *Samurai* only as an official. In the older days *Samurai* and *Heimin*—indeed, the various orders of these—dressed after a different fashion, and only the *Samurai* had the privilege of swaggering about with two swords in his belt. In the code of laws known as the *Legacy of Ieyasu* it is written—"The girded sword is the living soul of a *Samurai*." Each of the great *Daimyo* was obliged to spend half his time at the court in Yedo, and half his time at his country fief. The *Shogun's* capital was, indeed, the scene of a continual coming and going of barons and their retainers. Everything was matter of the strictest etiquette, this being the mode by which Ieyasu and his successors controlled the power of

[1] In a wide sense the territorial barons were also *Samurai*, but it is convenient and usual to restrict the term to the military vassal class.

the stronger *Daimyo*, and prevented intrigue and coalition against the central government. The smaller *Daimyo* again—for there was a most elaborate classification of these nobles—were compelled to change their provinces frequently. Ostensibly instituted to obviate misgovernment, this policy really prevented these *Daimyo* from acquiring strong local influence. The aim of the Tokugawa *Shogun* was, in fact, identical with that of William the Conqueror, who broke the decentralising tendency of feudalism by giving his barons scattered territories in different countries. But, in addition to thus systematising the military form of government, Ieyasu, by precept and by example, inculcated two great principles of conduct. The first was reverence and respect to parents and superiors —in a word, fealty and filial piety. The second was courtesy and consideration to inferiors. To the cultivation of these social and domestic virtues the Japanese owe much of that charm which delights the traveller of our day. Amidst the peace and seclusion enjoyed under the Tokugawa rule, Japan became, as one recent writer puts it, the land of gentle manners and fantastic arts.

But there is another side to this picture. With the exception of the *Samurai* of highest rank, who found ample scope for their energies in administrating their lord's affairs, these sworded gentry of old Japan had no suitable field for their faculties. To become an artisan, or worse, a despicable tradesman, was out of the question. A few, in certain parts of the country, turned their attention to agriculture. But the vast multitude were simply retainers with little or nothing to do but garrison their lord's castle or town, take part in some petty quarrel, or strut about with swords in belt. The support of this idle conceited class became a greater and greater drain upon the country's resources, and heavily and more heavily were the *Heimin* taxed. Then, as the centuries grew older, low class *Samurai*, owing allegiance to no lord, and ready to swear temporary allegiance to any master who might desire their services, swarmed all over the country. These were the *Ronin*. Turbulent fellows many of them were, ready to use their sword at the slightest insult.

Thus the noblest energies of these *Samurai* degenerated for lack of employment. Japanese privateers had once scoured the Chinese seas, and had established commercial relations with Siam. The base-born Hideyoshi had trained an army that had conquered Korea. But this doughty spirit of enterprise gradually decayed as the Tokugawa *régime* drifted to its doom.

It was a strange combination of circumstances that culminated in the abolition of the *Shogunate* in 1868. The strong rule of the earlier Tokugawas gave free scope for a leisured though limited class of *literati* to spring up. The Princes of Mito, themselves closely allied to the ruling *Shogun*, were conspicuous patrons of learning. A revival of all things Japanese followed; Japanese literature was cultivated instead of the pure Chinese classic; the primitive religion, Shinto, came into partial favour; and it gradually dawned upon the mind that the *Shogunate*, though established for centuries, was not the original form of government. With the ever weakening power of the Tokugawas, certain of the more powerful clans began to assert themselves. The arrival of

foreign fleets brought complications, which were made the best use of by these enemies to the Tokugawa rule, who thenceforth posed as the supporters of the Emperor's supremacy. The anti-foreign spirit was skilfully taken advantage of; the *Shogun's* treaty-making was denounced; and finally the *Shogun* himself was deposed. But no sooner was the Emperor established as the real ruler of Japan than his counsellors had to follow the same path of foreign policy entered upon by the *Shogunate*. Many of the lower class *Samurai*, full of the anti-foreign spirit, must have been astounded at this *volte-face*. Hard, indeed, was the fate of many of these when, with the revolution or so-called restoration, feudalism went by the board, and they were left masterless, homeless, shiftless. The higher-class *Samurai* could look pretty well after themselves: they are the statesmen, the politicians, the lawyers, the officials of to-day, and constitute the intellectual backbone of the country. A lower grade finds employment as policemen; but many of them who call to mind the romantic days of old, when the sword was their soul, must sigh after the good old times.

How much true patriotism actuated the hearts of the men of Satsuma, Choshū, and Tosa, who led the revolution, is a difficult question to answer. The Satsuma Rebellion of 1877, under the veteran general Saigo, has an ugly look from this point of view. No doubt the rebels argued themselves into leal subjects, who wished but to emancipate their sacred Emperor from the hands of self-seeking courtiers. We fancy, however, that clan jealousy and personal ambition were potent mainsprings of the movement that broke the *Shogun's* power. To go back a thousand years for reasons to support a political revolution is surely reading history backwards. It was indeed with no clear apprehension of the issues involved that the Satsuma and Choshu clans combined against the Tokugawa. In its subsequent policy, however, the *Sat-cho* combination, as it is called, is worthy of commendation. The leaders realised that they must give up their Orientalism or die a national death. Perseveringly have they pushed themselves, and drawn their country after them, into the moulds of our Western civilisation. Sage Orientalists shook their heads and prophesied a speedy relapse after a frantic spurt. Rather ambitious schemes were no doubt tried, only to be relinquished; but, broadly speaking, Japan has gone on steadily in the assimilation of nineteenth century wisdom. Money has doubtless been squandered at the expense of the tax-payer; but, on the whole, the farmer is better off than he was under the old feudalism. "Fickle Japan" are words that have often been sneeringly uttered. But wherein is the fickleness of a spirit that tries new things because the old are insufficient, that tries to replace the stupid by the wise? For two and a half centuries Japan had lived a stagnant life, sufficient to have reduced any nation to a condition of effeminacy. Yet, out of a revolution of blood and thunder, she has sprung into a new and stronger life. She has sought to make her own those elements of material civilisation which had developed in Europe during her period of stagnancy. She has striven to assimilate in less than a generation what we of the West have in muddled ways taken generations to evolve. Naturally she paid most attention to those features of our civilisation which had no counter-

part in her own. Naturally, too, she over-estimated these, and occasionally mistook the shell for the kernel. Nevertheless, judged by the ordinary conceptions of the meaning of civilisation, Japan has been phenomenal in her progress.

Now, there are two extreme views that have been taken regarding this unique education of a nation. The one is, that the Japanese are essentially imitators, losing their once national characteristics in their eagerness to take rank with occidental peoples. The other is, that this acquisition is purely superficial, simply a veneering, while the great heart of the nation is unaffected in its Orientalism. The truth lies midway between these extremes, as it ought to do if the Japanese have any of the elements that make a strong nation. A policy which brings outlying parts of the empire into close association by means of well-regulated railways and steamships cannot but awaken the slumbering commercial energies of a people. The imperial gift of a Representative Parliament—a thing hitherto unknown to Asia—must foster a lively interest in public affairs. The national activities are turned into new directions; patriotism has some chance of becoming a reality. And even down to the lower ranks the accidentals of our Western civilisation penetrate in curious ways. Within the last ten years shoemakers, tailors, butchers, and sellers of woollen stuffs have established themselves in every street. The butcher's establishment is a curiosity. Below is the shop proper, recognisable afar by its row of keen hungry dogs; above is a restaurant where the *soi-disant* "western meal" can be enjoyed. A western epicure would probably starve rather than partake, by the aid of chopsticks, of the flavourless stew of coarsely chopped hash which is served up with rice *ad libitum*. Yet such beef has an evident charm for the petty official who has not been abroad, or who cannot afford the well-cooked viands of a superior restaurant unattached to a butcher's shop. We have here, indeed, a very good illustration of the imitation practised by the Japanese. The imitation—even when it is simply the making of spurious labels for Bass's ale, Stock, or Pilsener beer—is not pure, is not perfect. It has a genuine Japanese flavour, a subtle something which marks it off from the thing imitated. The ordinary traveller, who stays perhaps two months in the country, and chiefly at the treaty ports, being ignorant of what is really Japanese, ignores this native essence in a custom or regulation ostensibly borrowed from the foreign West. In political and governmental spheres we find much that is certainly modelled after English, French, or German methods, but there is more that is of distinctly native origin. For example, we see in their police system a reflection of the French method. Yet before the restoration Yedo was controlled by a most efficient organisation of *gendarmes* and watchmen; and there is no doubt that many of the methods used then still survive. In the feudal days, when a retainer went out of the gate of his lord's *yashiki* or town residence, he left his *fuda*, or wooden ticket with name inscribed, in the hands of the gate-keeper. The University is now situated in one of the largest of these old *yashiki*, and each student who goes out of the compound must leave his *fuda* in the hands of the gate-keeper, just like the *Samurai* of old. There are many such links between the pre-

sent and the past—many evidences of a strong continuity underlying all the innovations that this era has brought.

The introduction of Western materialistic ideals into the national life of Japan has been attended with one undoubted evil. The old Confucian basis of morals and ethics has been rudely shaken—the old etiquette is losing its power. This is particularly noticeable amongst the descendants of the old *Samurai* who have grown up unrestrained by the gentle but inexorable etiquette of the Tokugawa feudalism. Obedience and reverence to parents and guardians, allegiance to their lord, loyalty to the Emperor—such was the *Samurai's* creed. But when his lord has been deprived of feudal power, when his immediate duties have been annulled, what can the average *Samurai* do but sink into a life of inactivity and semi-starvation? His sons, compelled to attend school, speedily out-distance their fossil parent in knowledge and learning. The more ambitious flock to Tokyo, full of disdain for the old plodding ways and the paltry ceremonial life their fathers had led. Beyond the influence of the parental roof, devoid of much of the early training that had been the heritage of every *Samurai*, scoffing at the old religions and caring nothing for the new, he begins to develop himself, undisciplined and vain. Such are the *Soshi*, who form at this moment a dangerous factor in the political life of Japan. Within the last five years one minister of State has been assassinated, and another has been maimed for life. The very recent conflict between the Government and the House of Representatives has accentuated the strained condition of things. The Emperor was obliged to dissolve the House, which refused, out of mere opposition to the Government, to sanction the grant for relief of the earthquake sufferers. For this Imperial act the ministers of State are now in daily danger of their lives. By a very peculiar logic the Japanese distinguishes between the Emperor and the Government which has been chosen by the Emperor. His loyalty to the Emperor is ostensibly of the highest order, for reasons which are not a little grotesque. Has not Japan the oldest dynasty in the world? True, on paper; but what of the directness of the succession, the critical historian asks. And was not Japan always loyal to her Emperor? A strange loyalty indeed which allowed the *Shogun* in the middle ages to do very much as he liked. He deposed one *Mikado* and elected another, a mere infant of days. He decided whether the son of a *Mikado* should succeed, or whether the successor should be chosen from some collateral branch. Theoretically, the present Emperor is a direct descendant of Jimmu Tennō; his true descent is concealed in a tangle of adoptions.

In a limited sense the old dictum of Ieyasu was true: 'The girded sword was the soul of the *Samurai*,' and many of them have not discovered a substitute for the soul they lost when the edict to disarm went forth.

Here I speak only of the lower *Samurai* class, and only of a certain proportion of these. For there is a great deal in breeding and in blood, and it is doubtful if a more perfect gentleman than a descendant of a blue-blooded *Samurai* family walks this earth. Amongst the University professors, for example, there are some ideal men, honourable to the core;

but they are old enough to have been trained in the old school of morals. One of them as a lad aided in the defence of Wakamatsu, the last castle that stood out for the vanquished *Shogun* in 1868. His mother died two years ago, and was followed to her grave by a retinue that would have done honour to a *Daimyo*. This lady was a beautiful type of high *Samurai* womanhood. Trained as a girl in the "three obediences" —obedience when unmarried to parents, obedience when married to husband and husband's parents, obedience when widowed to sons—she became in her old age the honoured head of a family well known in the arts of peace and war. And there are many such to this day in Japan—gentle-mannered, kindly and thoughtful, womanly in the best sense of the word, and yet possessed by a fearless *Samurai* spirit that will undergo any trial, any act of self-abnegation, even voluntary death, in the interests of husband and family. In old Japan—romantic in retrospect whatever it was in reality—the *Samurai* women were taught the use of the sword, and were drilled to act as guardians of the castle should the necessity arise. In troubled times each lady carried with her a small dagger for defence or for suicide. But in all this nothing was done or intended to be done for self, but only for her husband, for her children, for the honour of her husband's house. The whole duty of women is summed up in the words obedience and self-renunciation. It is, I believe, because of the cultivation of this spirit of self-sacrifice that we find in Japanese women so many of those characteristics which we commonly associate with pure Christian sentiment. In the treatise known as the "Greater Learning for Women" (*Onna Daigaku*) it is laid down in unequivocal language that a girl's destiny is to wed, that a girl's duty is to absorb herself into her husband's home. If she does not please her husband and her husband's immediate kin, she has failed in her duty. Whatever the hardships of her lot, whatever the difficulties she has to meet, she must always maintain a cheerful countenance in the presence of her lord. Should she have occasion to remonstrate with him for unreasonable or dissolute actions, it must be done with composed mien and gentle voice—that most excellent thing in woman.

These womanly traits, cultivated to perfection in the higher *Samurai* classes and their present-day representatives, also exist more or less in the descendants of the lower *Samurai* classes. In the still lower ranks of life, when the wife has often, so to speak, to put her hand to the plough, there is less convention, less indoor existence. When we consider, again, the girls that compose the waiting class in inns and tea-houses we meet with a different code of conduct altogether. In one particular, however, these are at one with their nobler compatriots. They must act so as to please—in this case, of course, the guests. The charms of the Japanese waitress have been described by some recent writers in a most extravagant vein, and I venture to think much of the so-called charm depends upon the novelty of the situation. The foreign tourist alights at an inn; several healthy-faced damsels collect on the verandah near, and with low obeisance cry aloud in strained accents, which *some* think musical, *O irrashai, O irrashai*, which simply means "please enter," although certain bookmakers would translate it "the

honourable entrance is solicited." A little later the weary traveller, stretched on the mats of his own room, thinks he would like his bath made ready. So he claps his hands; and up from the dingy corners of the huge kitchen there ascends a chorus of voices of reedy quality yelling *Hee.* This exclamation also serves throughout any delivery of orders much the same purpose as our familiar "Yess'r," "Yes'm." As he leaves, the guest's ears are almost deafened by the high falsetto intoning of the words *O kaeri nasai, O kaeri nasai*—"please come again, please come again." Here again, of course, a so-called Oriental flavour might be given by translating the phrase "the honourable return is implored." These happy-faced waitresses form a bright picture in sunny Japan. From their innate desire to please they will laugh and giggle when they are expected to, even at the most miserable of jokes. But it is easy to see that they bear towards the strange, blundering, foreign traveller a very different attitude from that which they assume towards a Japanese guest. Amusement and novelty excite her as much as they excite him. Ignorant, in general, of the etiquette of inn life, he takes liberties, to which she, with quick-witted intuitiveness, responds by simply making fun of him. The experienced traveller, to whom the ways of the Japanese are familiar, finds the manners and the service of the inn satisfactory enough, but far from romantic. Similarly, the fair waitresses get no extra amusement from him, and treat him just as they would one of their own countrymen, with quiet respect and placid mien. When not perturbed by what must seem to her to be simply foreign vulgarity, the waiting-maid of Japan performs her duty quietly, faithfully, and unobtrusively. It is too true, however, that near the open ports, and in regions overrun by the globe-trotter with his inevitable camera and dry plates, there is a marked deterioration in the manners of the lower class Japanese. It is mournful to have to confess that the traveller is himself to blame for this.

And the same holds for the servant class generally. A distinct line must be drawn between the servants of the Japanese themselves and the servants of the foreign residents. They belong to different guilds or cliques. A servant in a Japanese household is one of the family and identifies himself or herself with the best interests of the family. Those, however, who enter foreign service are usually engaged for very definite duties and at a comparatively high wage, out of which they find themselves in everything except the room they occupy. In the open ports the servants are to a great extent self-seeking and even dishonest; but in Tokyo, and in districts where only foreigners in Japanese employment can live, they compare most favourably with the same class in other lands. If their foreign master and mistress treat them with the courtesy which Ieyasu counselled all superiors to show towards inferiors, and, furthermore, do not lose their dignity in loud scolding and bullying, Japanese servants become a treasure. They will see to it that no rogue of a tradesman overcharges for goods. They will enter heart and soul into the interests of the household. If guests are being entertained—and in Japan the guest is almost a sacred being—they will make preparations with extraordinary zeal, and will as zealously bring things

back to their normal condition after the guests are sped. The peculiar graces of Japanese politeness show themselves here as in higher ranks. Gentleness of manner and total absence of brusquerie are its fundamental characteristics. To these graces, which permeate more or less the whole social atmosphere, must be ascribed the lack of rough boisterousness in foreign children born and brought up in Japan. The boys are high-spirited without being rough, the girls are merry-souled and full of frolic without being spiteful or "screamy."

As Sir Rutherford Alcock long ago said, "Japan is a very paradise of babies." Lashed securely to the back of an older brother or sister, many an infant of weeks or months makes early acquaintance with the street, the sunshine, and the play. Or it may be the mother herself behind whose head the little pate wobbles from side to side and the dark slit eyes gleam. Possibly the baby sleeps; but still the mother's voice goes crooning some lullaby as she shuffles along the path or lends a hand to push her husband's cart. In the well-to-do classes, the very young children seldom appear beyond the garden precincts, and the bigger children are not allowed to play in the street. Then, in the house, with its soft matted floor and its space quite innocent of any furniture, what a perfect arena for the infantile manœuvres of the rolling bit of humanity

"that canna gang its lane."

No fear of ugly blows from corners of sofas, tables, chairs, or stools; and for the toddlin' bairn no forbidden ornaments to finger, no breakables to bring him into disfavour with the household deities.

Toyshops are surely a mark of a high civilisation. There they are in every Japanese street, displaying their tempting stores in piled-up tiers upon the floor, unprotected by any plate-glass window. Prices range from 1 sen—less than ½d.—up perhaps to 10 sen, which is about fourpence. Miniature guns, swords, bows and arrows, workman's tools, models of domestic utensils, dolls, and everything the heart of child-loving man can devise, are there in quantity. And they are a child-loving race, the *Mikado's* subjects. In our opinion, indeed, they rather spoil their children; yet so mingled with this child-worship is the instilling from earliest years of Confucian wisdom that the evil results do not ensue which would almost inevitably follow if our children were trained up on the same lines. There is a subtle influence, surely, in their very forms of address, brothers and sisters even affixing the *san* as they call out to one another. *San* corresponds to our Mr. or Mrs. or Miss, and, except in addressing servants of the very lowest rank, is used invariably. It is usual also to prefix the honorific "O" when addressing a girl—for example, *O Kiku san* (Miss Chrysanthemum), *O Ume san* (Miss Plum Blossom).[1] Boys do not get this "O"; and their names are not chosen from the beautiful in nature, as so many girl's names are. They may be taken from the strong in nature, as, for example, *Tora san*

[1] This use of the honorific by a people whose womankind is still in a condition of virtual bondage warns us against placing too much confidence in forms of expression as an index to feeling. Compare our own "your humble servant."

(Master Tiger). In the better-educated classes, however, a combination of Chinese characters is chosen, with some lucky significance. Naming after relatives is not common, and, as it is against the law for a Japanese to have a middle name, the necessary distinction is not unusually effected by inventing a new name or modifying an old one. This is very easily done with the practically infinite number of Chinese characters at their disposal.

Glance again at the games, many of which are very similar to, if not identical with, our own. In spinning tops and flying kites the boys excel, while nothing can compare with the dainty and frolicsome grace of the girls playing battledore and shuttlecock or bouncing their balls. The battledore is of wood, and the tap-tap-tap, mingled with merry laughter, is heard all along the streets at the great festive time of the New Year. Frequently a blithe damsel challenges a male friend to a bout, and he almost invariably comes off second best, as the black charcoal streaks on his face—one for every miss—sufficiently betokens. It is during the New Year's week that kites hover above in thousands, kites of all forms—square, circular, man-like, or like a great hawk poising.

These two sports are not confined to lads and lasses, but are indulged in by the older people also, who never seem to lose their fondness for play. There are cards, however, and a kind of chess, and that most complicated of games *Go*, to absorb the mental faculties of the cleverest.

The third day of the third month is the Girl's Festival, and this is held by all classes from nobles to coolies. In the better classes little effigies of the *Mikado* and his wife and the court nobility—all in the ancient, stiff, and not very artistic robes of state ceremonial—are exposed to gaze, and with these and other dolls the girls have a happy time. The Boy's Festival is on the fifth day of the fifth month, when from a bamboo pole, surmounting every house where a boy is, a long paper carp flies. The head of the fish is tied to the pole, while the body balloons and fluctuates in the breeze. The motions are startlingly life-like. The carp, which races up rapids and leaps up waterfalls, is regarded as a symbol of the indomitable spirit of man overcoming all obstacles.

From oldest to youngest they are a holiday-loving people. For a bright *abandon* without boisterousness a Japanese crowd *en fête* can hardly be surpassed. This side of the national life has been dwelt upon by nearly all writers on Japan; so much so, that many who derive their information from books must have a very lopsided conception of what a Japanese is. It is with such scenes in his eye that one admirer of the people writes, "They have the nature rather of birds or butterflies than of ordinary human beings." Well might the earnest-minded Japanese say, "Preserve us from our self-appointed champions!" One cannot but feel a great pity and a strong sympathy for a nation that is terribly in earnest and yet is held up to the wide world as more bird-like than human. We might do worse, indeed, than strive to imitate the Japanese in this power of casting from them the cares of life for a season and entering with childlike zest into the universal merriment of an hour. The Japanese dearly loves a joke and has not yet lost that faculty of

laughter, over the decay of which the *Spectator* recently mourned. As Shakespeare has it—

> 'A merrie heart goes all the day;
> Your sad tires in a mile-a.'

A more hopeful augury Japan could hardly find.

There is, however, one curious mode of festal enjoyment for which it is impossible to get up any enthusiasm. Novelty may give interest and amusement at first; but this soon wears off. I fancy some trait of barbarism lingers in all nations. And in the discordant tom-tomming, whistling, and chanting which accompany certain forms of festival dance we must confess that the Japanese touch closely on the savage. Generally, too, it is a religious fête in connection with some temple. A Juggernaut-like car passes along the street, carrying the effigy of some deity and a band of so-called musicians. Or it is in the temple-court itself, where a permanent stage or platform is adorned by a posturing figure, probably masked, treading out a complicated measure to the rhythmic noises of the orchestra. These *Matsuri* or fêtes are of course only of interest to the common people. The higher classes take their enjoyment of similar character on rare occasions by witnessing the classic *No* dance. This combines a histrionic representation of some legend or tale of heroism with the most extraordinary musical *obbligato* that can be imagined. In stiff garb and stately mien the chief actors glide through their monotonous chant, broken by fitful caterwaulings, shrieks, whistles, and drum-beatings from four or five solemnities in the background. The acting is impressive, though conventional and somewhat stilted. The vocal and instrumental accompaniment strongly suggests Milton's "hell-hounds" ringing "a hideous peal." This particular kind of music that embellishes the *No* performance is the genuine Japanese classical music. Occasionally, as in realistic representations of storms and battles, it is powerful and appropriate. It is distinctly Wagnerian in the position it assigns to the human voice amongst the other instruments; and this is a characteristic which runs through all the styles cultivated by Japanese musicians. Of these there are several schools, which never overlap. For instance, the Chinese musical school, as it is developed in Japan, is peculiar in the high pitch in which the leading female voice chants the libretto. There is melody in the airs and tunefulness in the instrumental *ensemble* of fiddle, guitars, and flutes. But there is no harmony in our sense of the term. Each piece is very long and wearisome in its apparently endless repetitions.

The most interesting school of music is, however, that which cultivates the higher class of popular music. The important instrument is the *Koto*, a kind of six foot zither of thirteen strings. In an orchestra there may be two *koto*, a *samisen* (or three-stringed guitar), and a *shakuhachi*, which in form suggests a flageolet, in sound a wheezy flute-stop of a damaged organ. This last-named instrument is said to be very difficult to play; would that it were impossible! The performer must never take a desired note purely, but must approach it by a short-lived quarter tone and leave it with a gasp. The scales on which Japanese popular music is based are similar to some of the old Greek

and mediæval church scales. Many of the cadences have a flavour suggestive of Scottish airs in the Dorian mode. In the tuning of the *koto* five notes are given to the octave, which may be represented as intervals by the tonic sol-fa notes *s t d m f*. But by pressing any string beyond the bridge the corresponding note may be lifted in pitch a semitone or even a tone, and, as this is being done constantly by the *koto*-player, we have no right to conclude that the Japanese scale has only five notes to the octave. Any simple western air can be played by a good *koto*-player in as correct intonation as is given by the piano. On the other hand, the pressure notes on the *koto* give to Japanese airs a peculiar flavour which cannot be imitated on our piano, and can only partially be produced on the violin. The peculiarity might be termed a pitch-swell, and can be easily given by a voice gliding up a semitone and down again, all in one second of time.

Like painters, ivory-carvers, workers in bronze, and other artistes, musicians form a distinct and largely hereditary professional class. The sword-girt *Samurai* of old engaged them to add to the brilliancy and variety of his festive evenings. And there still exists a disposition on the part of those of *Samurai* descent to look down upon the art, although, under the influence of the foreign spirit, some few are beginning to cultivate their faculties in the Government Musical Academy. The fact that Japanese girls can, when trained, sing our music in good tune, and can learn at the same time both the western violin and the Japanese *koto*, shows that there is no fundamental disparity between their scales and ours. It does not seem, however, that Japanese music speaks to the proud *Samurai* ear any more distinctly than it does to the arrogant European ear. Politely they listen through a long piece of variations upon an air, but their interest is excited only when the words sung or recited appeal to them. One of the most interesting of musical experiences is to see a Japanese audience sitting enthralled at the famous *Heike monogatari*, the ballad history of the struggle between the Heike and Genji, or Taira and Minamoto clans, in the 12th century. This great struggle for supremacy may be likened to the Wars of the Roses. It is a tale of wild and fierce fightings, and ends with the complete extermination of the Heike or Taira clan. In the final battle at Dan-no-ura, near Shimonoseki, a terrible slaughter takes place, and the tragedy reaches its climax as the widow of Kiyomori, the late Taira Chief, leaps into the sea with Antoku-Tennō, the child Mikado of five years, in her arms. As the minstrel chants through the wild lay to the still wilder accompaniment of his guitar-like *Biwa*, the attention of the listener becomes tenser and tenser. The men with immovable features stoically suppress their deep emotion. The women find relief in silent weeping. They come, indeed, prepared for this emotional dissipation with a good supply of handkerchiefs in their satchels. In the hands of a master the *Satsuma Biwa* is undoubtedly a most appropriate instrument for accompanying those heroic lays of Old Japan. Its chief peculiarity is the high frets, which enable the performer, with great effect, to produce those pitch-swells or intervals in continuous motion that have already been referred to.

But by far the most popular instrument amongst the lower classes of Japan is the *Samisen*. The professional singing girls or *geisha* are proficients on it; and the strolling minstrel, the descendant of the once outcast *Eta*, makes its twangy tones audible in every street. It is never used as a solo instrument, but always accompanies either singing or dancing. The singing is really recitative, and the dancing is posturing, sometimes very effective and even impressive—but, after the novelty has worn off, excessively wearisome to the foreign ear and eye.

In brief the Japanese are, musically, sadly to seek, and we are not surprised that the high-minded *Samurai* should despise the art. Historically, music and dancing received their great impetus at times of effeminacy and corruption, and to this day *geisha* performances are usually associated with frivolity and dissipation. In former days, when convivial gatherings were ungraced by the presence of the *Samurai* ladies, the necessary feminine element was supplied by the witty, accomplished, well-mannered, and fascinating *geisha*. These were the halcyon days for the professional singing-girls. But with the changed times the ladies of the upper million are beginning to take upon themselves the duties of entertainers as well as ministering angels. The *geisha*, being no longer in demand for high-toned socials, has consequently lost status. This no one can deplore, unless he belongs to that soulless sect of scientific investigators who deplore the impossibility of seeing a good cannibal feast in these days of Church Missions.

The whole question of the social position of woman in Japan is now of surpassing importance. I have touched on the broad features of the old etiquette which kept the wife completely in the background. This etiquette still holds under conditions which are purely Japanese. For example, when dressed in native costume the husband will precede the wife. But when decked out in Western robes the wife will be graciously permitted to enter a room in front of her husband. Truly in Japan the woman has no rights; she has only the great privilege of being allowed to please the man. In spite of the indications that a new dawn is breaking, it is significant that no woman can be present as a spectator in either House of Parliament when the diet is in session. The time is one of extraordinary transition, unexampled in the history of a civilised nation. The rising generation of girls have a delicate problem before them. To preserve continuity in the passage from a condition of virtual bondage to one of comparative liberty, and to retain throughout those womanly qualities that are their special charm—this is *their* problem. The man of *Samurai* descent has his problem too; and it is no light one. With all his courteousness and high honour the old *Samurai* had a *hauteur* about him, a disdain for the common arts of life, a spirit of revenge, which are out of sympathy with the social movements of the age. To eradicate these will be no easy matter. To the turbulent *Soshi*, and to the constitutionally appointed House of Representatives alike, some of these old-world sentiments cling. To take the life of a prominent man is no crime in the eyes of many of his political foes. The spirit of the *Vendetta* still lingers, unfortunately, as witness the crowd of worshippers who continue to burn their incense at the tomb of the assassin of

Viscount Mori, the late Minister for Education. So near is the nation to its feudal times that the Japanese do not have that feeling which we have for the value of a life. A man is murdered—yes, very pitiable, they say, but what matters it—*shikata ga nai*—it cannot be helped—there is no use crying over spilt milk. In the recent very narrow escape of the Czarewitz at the hands of a momentarily-frenzied constable Japan got a very significant lesson from which it is to be hoped she will profit. It is easy for people to be wise after the event and to blame the Government for not strongly suppressing the lower class newspapers, which had been indulging in a fierce Russophobia. But it is hardly possible for us to think ourselves into the position of the Japanese. Foreign residents in Japan do not know all the outs and ins of political life in a country whose press is under a censorship that in this land would rouse the very walls to mutiny. They never know all the plots and intrigues that are nipped in the bud by sudden and severe methods. They cannot appreciate the feelings of resentment that the *Sat-cho* combination rouses in many a truly patriotic breast. Theoretically Clan Government went by the board in 1868; yet after all it has practically been a replacement of the Tokugawa by the generals of Satsuma and the statesmen of Choshu. The more thoughtful minds feel little confidence in the sincerity of the statesmen whose clanship has put the helm of the State into their hands. At the same time they have no confidence in the ability of any of the political agitators outside of the Government. Many of them looked with foreboding at the new constitution, with its House of Representatives and House of Peers. The country, they felt, was not fit to govern itself. Recent events have to some extent borne out this view. In its second session the House of Representatives proved so stubborn and pigheaded that the only course the Emperor could pursue was to dissolve it. When we call to mind the storms and tribulations through which our own Parliamentary system struggled to its present imperfect condition, we need not be astonished at what has happened in Japan. To criticise is easy, to scoff at the temporary failure of a grand experiment is easy too; but the critic and scoffer should see to it that there is no obstructive beam in his own eye.

The Japanese themselves recognise that they are in a muddle. This truth a native religious paper lately made the text of a call to repentance. After pointing out the misfortunes and calamities of the past year—the burning of the Houses of Parliament, the deaths of Prince Sanjo and Prince Kuni, the attack on the Czarewitz at Otsu, the great earthquake in the centre of Japan, and (most ominous of all) the sudden extinction of the lamps at Ise Temple—this journal thus continues:[1]—

"There are persons who would chaff and say that the fires resulted from carelessness, the deaths from influenza, the Otsu attack from a disordered mind, the earthquake from a law of nature, and so on. Such remarks we may expect to hear from professors at the University or from other shallow persons who have swallowed the spittle of the foreigner. But the true reason for these things is this. There is the mind of the Universe, there is the mind of Gods or Buddhas, and there is the

[1] *Japan Mail*, January 2d, 1892.

mind of Man. These are not many but one. The first is all-present, the second all-pure, the third an impure mixture. The last is spirit buried under human dust, the second is pure spirit, the first is without substance. The Gods and Buddhas teach us beforehand our fortunes and misfortunes. Now, to-day all is confusion and disorder in Japanese society. Religious people, newspapers, even the jolly storytellers are quarrelling. Poets and novelists sharpen their nails to scratch each other. The whole nation is a struggling chaos. What are the earthquakes and other physical phenomena but the reflex result of this great commotion? The fault is with ourselves. Our minds are dark; this is the significance of the extinguishing of the lights at Ise; and thus have all these events their meaning. It is for us to reform our ways and gradually to achieve, by patient individual effort, that happiness for which we are fitted."

Whatever may be thought of this sermon, the style of which is not altogether unfamiliar to us, there is little doubt that Japan is forsaking the once well-trodden ways of the gods. It is usual to speak of the Japanese having two religions—namely, Shintoism and Buddhism. In proper parlance, however, Shintoism is hardly worthy of the name of a religion, and now the struggle for supremacy is between Buddhism and Christianity. A few years ago Christianity, which had so far received its impulse almost entirely from foreign missionaries, entered upon a new phase. Certain young ardent spirits of Christian leanings and high culture determined to give shape to a national Christianity. They were not to be bound by the dogmas of any Western sect, dogmas which so often reflect the historic struggles through which that sect has passed. Such a movement, pushed by men of education and of good descent, might well make the Buddhist priests tremble for the future. Notwithstanding the prevalence of Buddhist shrines and Buddhist sects, it is doubtful how far true Buddhist doctrines have influenced the heart of the nation. With the rise of the Tokugawa power, a new philosophic influence was introduced from China, and intellectually Japan forsook the Buddhist paths, and adopted the pantheistic philosophy of Shushi. This *Tei-shu*[1] system retained its sway in spite of the revival of pure Shinto, which at its best only affected a small number of the educated class. Under it the *Samurai* life was moulded, and the great *Samurai* creed of fealty for the man and obedience for the woman took final shape. The bulk of the nation, however, remained Buddhist, their Buddhism being elastic enough to absorb such Confucian teachings as reached them, or such traditions as had lingered through the centuries. Indeed, the popular notions regarding the lower regions, presided over by Ema Sama, are more suggestive of Dante than of Gautama. It must be noted also that there never was, nor now is, an antagonism other than priestly between the bald, meaningless, because archaic, Shinto rites and the elaborate and more spiritual forms and creeds of Buddhism. A low class Japanese will mutter his prayers as reverently—or as irreverently—at a Buddhist shrine as at a Shinto shrine. The streams of pilgrims that every summer ascend the high hills to perform their vows have no

[1] See a recent paper by Rev. Dr. Knox, *A Japanese Philosopher*, in the *Trans. of Asiatic Soc. of Japan*, 1891.

dogmas to irritate their placid souls. Special reasons may make them pay a visit to the shrine of some special deity or hero, but that in no way prevents them worshipping at any other important shrine they may chance to pass. Most tolerant is the workaday faith of the average Japanese. Then, again, the educated Japanese of to-day, who is not Christian, is usually Agnostic of the purest Gaius type. One function of the priests, both Shinto and Buddhist, is to officiate at important ceremonies, such as funerals or the naming of children; and it simplifies matters greatly for a non-Christian Japanese to belong to the sect whose temple lies nearest to his abode. If he has changed his residence several times, he may thus belong to several distinct sects, and the collector of each will call round at his house at regular intervals for his donation. Such social duties obviously add to the stability of the traditional religions and rituals.

Japanese Buddhism, it may be mentioned, is widely divergent from its Indian prototypes. There are numerous sects, which denounce each other as heterodox, very much after the fashion of our sects of Christendom. These differ on points of doctrine and practice, but outside the priestly circles no real interest is taken in their disputes. The sacred books have never been translated into Japanese.

Shintoism, on the other hand, has no books, no dogmas, no moral code. Its precept is, Do as you like, only obey the Emperor. It is essentially homage to the Japanese spirit of the past, homage to the gods, to the former *Mikados*, and to the manes of heroes of old. Its rites are intimately bound up with certain court ceremonials. Of these rites purification by water is one of the most important. I have heard it stated by an intelligent Japanese that, though Buddhism brought letters and the arts, Shintoism is the source of that cleanliness which is so characteristic of the nation.

Probably no people on earth understand better the art of taking a bath; and certainly none enjoy it more. A Japanese hot bath in a Japanese bath tub is a luxury of which those who have experience only of zinc or marble baths can have no conception. Every respectable house has its own private bath, while in every town and village there are public baths for the vast multitude to disport themselves in. Then, there are numerous spas with natural hot springs, usually sulphurous and medicinal. The unconcern with which a Japanese will take a bath in full publicity, if the conditions of the place require it, has often struck a foreign traveller unpleasantly. In his haste he has said, or at any rate thought, "What immodesty!" and has similarly animadverted upon the promiscuous bathing of men, women, and children in the districts where present-day police regulations have not been enforced. But here, as in many other cases, we should not judge of a custom from our point of view. In the present instance cleanliness is the object sought, and the etiquette of the bathroom, or of the bath, if there is no room, differs from the etiquette of the parlour. With us the attitude of waltzers is only permitted when the music is sounding. In somewhat similar wise is it with the Japanese. When the necessary operations of washing or doing other work require it, to strip becomes a duty. On the other

hand, a Japanese woman would scorn to appear *décolletée*; to her eye our ball-rooms are an astonishment, and exposure of the person for display is incomprehensible. Which race is the more conventionally modest I leave others to decide to their own satisfaction.

The external details of Japanese life have been incidentally touched upon, only in so far as they seem to throw a further light upon the deep springs of the Japanese character. In general, the daily customs reflect the daintiness and æsthetic grace which enter so largely into the life of the people, but not always. For example, a Japanese meal is served daintily, very daintily, but there is a certain lack of grace in the manner of its consumption. Without napery of any description, without knives and forks, without spoons, with only a few lacquer bowls and porcelain cups set neatly on a raised tray—such is the preparation for a Japanese meal. It has an artistic beauty all its own.

Familiar to all of us is the position Japan takes in regard to art; even the semi-spurious specimens which are now manufactured for the foreign market are sufficiently artistic to arrest attention. But what strikes the resident more and more, the longer he sojourns in the Land of the Rising Sun, is the display of true æsthetic feeling in small things even more than in great things. An ordinary crockery shop is simply a treasure-house of bowls, cups, and plates of dainty form and delicate pattern. In such you can buy a real work of art for a few *sen*—a single plate, perchance, which Keats could have apostrophised as a "thing of beauty" and "a joy for ever."

The exquisite droop of a branch over a wall will arrest the attention of your *betto* (groom) or *jinrikisha* runner. The very chimney-sweep will get ecstatic over a vase with a single spray of plum-blossoms set in it. And their whole method of exchanging presents—how graceful, how full of delicate feeling, how æsthetic in the very act! Even a present of fish assumes, in Japanese hands, a positive attractiveness. In a shallow oblong wooden pail, half-full of water and lined with green leaves, splash the live fish, in all the beauty of life. A delicately embroidered square of crape or satin is used to cover the tray on which any gift is laid, and, be it eggs or a roll of silk, it is equally delightful to the eye. The etiquette of present-giving on special occasions is very strict, and, where the circle of acquaintances is large, the lady of the house has no easy task to perform. A large share of her time is taken up in selecting and despatching pretty or useful gifts. In the feudal days it was more honourable to receive a gift of money than a set fee for any service rendered; and in this custom we readily find one explanation of the unbusinesslike character of the average Japanese. But, in spite of the rigid requirements of etiquette in the giving of presents on special occasions, the Japanese delight in exchanging gifts at all possible times. Birthdays are not held in particular honour in this respect; "unbirthday presents," as Humpty Dumpty would call them, bulk far more largely in the social horizon of the race. In their shop signs, too, the lines of beauty lie embodied. A Chinese ideograph is a work of art; it is a decoration as well as a word-picture. It delights the eye of the foreigner, even although he be ignorant of its meaning. As one writer has said,

"Whatever these people fashion, from the toy of an hour to the triumphs of all time, is touched by a taste unknown elsewhere."

Take another artistic characteristic, which has not been so much noticed as it deserves—I mean landscape gardening. Of this the Japanese is a perfect master. To the eye that has become educated to the irregular symmetry and restful beauty of a Japanese garden there is a garish vulgarity in our flower-beds, with their regular rows of rainbow colours. Also, is not the Japanese conception of a garden as a retreat for calm enjoyment far superior to ours? In the great majority of cases we have our front garden conspicuously displayed, while the back garden is devoted to peas and cabbages, clothes' ropes, and such like. It is quite otherwise with the Japanese. When you call at his house, you enter by what has all the characteristics *to us* of a back door. You are then led to the guest-chamber, which lies at the other side of the house, with its verandah opening upon a perfect fairy land of a garden. There you sit and smoke the pipe and sip the tea of friendship in easy desultory chat upon things in general. The host may suggest a stroll in the garden, which, though no larger than a fives'-court, will nevertheless repay careful inspection. Every bush is set with a meaning; every stone has a significance. The fundamental idea of a Japanese garden is a place for summer enjoyment of a leisurely character—as one poet puts it, "a place to stroll in when aroused from sleep." Hence a garden must look cool; and this is best effected by having a pond in it. Should the nature of the ground not permit of water being introduced, then it is very usual to suggest the idea of water by suitable arrangements. A little bridge crossing a pebbly bed, a flat stretch of sand or bare earth to suggest a lake, are very common tricks, and the delusion is further aided by the grouping of hillocks, rocks, and shrubs. The effect of a Japanese garden is one of delicious restfulness. One simply looks and enjoys, and is never tempted to pluck a flower. Flowers indeed are subsidiary to the general effect, and are never crowded together. In their right place flowers, nevertheless, are intensely admired by the Japanese; but it is an eye-worship, not a nose-worship. At the time of the cherry blossoms, when the leafless trees are covered with the delicate pink white petals, and the whole air is filled with the subtle perfume, the Japanese turn out in *gala* costume to the parks and gardens to enjoy the beauty of the scene. And so on through the year; in May when the Wistaria hangs its pendulous heads over the ponds at Kamedo, in June when the Iris unfolds its chalices in the garden of Horikiri, in August when the Lotus lifts its globular flower above the broad leaves that float in the muddy waters of the moat, and in November when the Chrysanthemum is the cynosure of every eye, all Tokyo gathers to gaze. The Camellia blooms steadily, and we think beautifully, for several months in spring and early summer, but it is not admired by the Japanese. It is considered unlucky; its blossom falls off whole in a way that reminds them of a decapitated head.

In this connection, also, we should not omit a reference to the exquisite beauty of their castles and moats. A drive along the esplanades that sweep round the broad moats of Yedo Castle is a succession of fine effects, especially charming in moonlight. The massive walls, where huge stones

of varied size and shape fit with an accuracy that needs not mortar, rise in noble curves above the limpid surface, while over their broad tops spread the long branches of the pine trees which find their root in the earthy rampart behind. Truly the Japanese understand, as no living race does, the beauty of form.

The exquisite grace of the Japanese dress has been dwelt on by all writers. It seems fitted, in a peculiar way, to emphasise the good points of the being it adorns. A man who looks very ordinary, not to say ugly, in European costume, is transfigured when he dons the unofficial robes of an old *Samurai*. It gives him a fine nobility of bearing and manliness of mien. Still more striking is the effect of dress upon a Japanese lady. In her own exquisite and delicately tinted garments she is the personification of beauty and grace, of perfect manner and high breeding. Decked out in Parisian robes of finest quality and make she becomes gauche, plain-looking, a thing to pity. It is very extraordinary that the adoption of European costume seems to scatter to the winds the very rudiments of true taste in the Japanese. The woollen shops are full of knitted caps and shawls, the red, green, and yellow stripes of which are something to wonder at. This cannot be explained as a result of imitation, for no European or American outside a harlequinade or circus would dare wear such dreadful combinations of colours. It looks almost as if the Japanese had derived their own practice of colour-blending from an elaborate code prepared by some æsthetic genius of old—let us say a gift from the gods. What the code does not cover they must decide upon their own erring responsibility. And oh how erring! for, whatever be the explanation, there is no doubt that in new directions calling for an application of fundamental æsthetic principles the Japanese errs in a very extraordinary manner.

Perhaps the weakest side of the Japanese nature, intellectually as well as æsthetically, is this failure to get at principles. But after all, is not this exactly the weakness of humanity generally? It is only aggravated or made more apparent in the Japanese because of their peculiar circumstances. In the rapid and unexampled transition through which, in these thirty years, they have passed, the best powers of the people have been strained over and over again. Particularly true is it of them that their destiny seems too great for them. Empire though they call their country, they have not attained to anything like an imperial conception of national life. Side by side with the steam-engine, the telegraph, and the telephone, there exists in the mind of the half-educated masses a mediæval regard for omens, lucky days, charms, and superstitions. The nineteenth century rubs shoulders with the fourteenth. Loyalty to the Imperial house is based on the fiction of a divine descent. When the fiction appears in its true colours, as it must do ere long, what will happen to the loyalty? The better educated Japanese of to-day may laugh *in English* at the folly of the idea; but to hint at such *in his own language* would be as much as to say, Write me down a traitor. In the cultured classes also we find a lack of many of the evidences of an all-round intellectual vigour. Only in one direction, that of pure and applied science, have they made any real progress. In former days they

added nothing of value to the philosophy which was simply borrowed from China. In these days they take no deep interest in the philosophy of the West. In purely Japanese or Chinese literature nothing has been done of late which can compare with the masterpieces of a remote past. Modern journalism and modern thought have together developed literary styles which must be sickening to the eye of the old-world scholar. It is extraordinary to note how youthful are the editors and essayists that would fain lead opinion in Japan. In the circumstances of the case this is perhaps unavoidable, and it is an evil which time will doubtless cure. There is ample evidence that the Japanese literary man is very utilitarian in his views, and the modern mind of the nation has not yet awakened to the full significance of literature as such. Fiction and poetry are at a very low ebb. Poetry, indeed, as recognised by the Japanese, is an archaic art, so it is small wonder that the present era cannot produce one true poet. With our poetry they have no sympathy. Of the many University professors, all of whom know English or French or German well, I have met only one to whom Shakespeare meant anything. Novels they read for the plot, so that Wilkie Collins cheers where Thackeray bores. In law they have, with the assistance of distinguished foreign jurists, drawn up admirable codes. But there is still to be trained a bench and a bar able to apply and develop these. Japan has not yet produced a true historian. Even the most recent historical studies by the Japanese themselves are vitiated by the lack of judgment. All is tainted by certain preconceived opinions, by what might almost be termed superstitions. Some of these have been already touched upon—for example, the fictitious basis of the national loyalty, the unbroken succession from Jimmu Tennō, the supposed facts concerning that semi-mythical Emperor himself. At present the mind of the nation is not fitted to take in the truth that the early "Emperors" were only chiefs of the strongest clan, and that down to the days of Ieyasu Japan was the arena of clan struggles for supremacy. But one of the most extraordinary superstitions is that the Tokugawa *régime* was the period of retrogression in civilisation and the arts. It is amazing to find educated and otherwise sensible men maintaining that "in the beginning of the eighth century the people enjoyed security of life and property," and had reached a higher level of civilisation than they attained to in the eighteenth century. Compare with this statement these facts—letters had been comparatively recently introduced, and slavery was still wide-spread and continued for many centuries later.

In scientific lines the Japanese have shown a distinct aptitude. They are quick at the "up-tak'," and facile in reproducing the knowledge gained. Here their wonderful memory stands them in good stead. It is perhaps a little too soon to look for the existence of a really original scientific thinker. Yet men might be named who have already made their mark, and whose investigations are known to all who are interested in the subject. In engineering and other practical developments of science they must, however, be content for many years to come to follow the experience of the West.

Foreign residents not unfrequently lose their patience over what

seems to be Japanese perversity. The Japanese, in fact, have habits of thought and methods of doing which to us appear complete inversions of the natural. Their very modes of expression are, so to speak, topsy-turvy. A prolonged residence in Japan is, indeed, a splendid training in patience. For the Japanese are never in a hurry and rarely in a flurry, and like all Orientals they are perfect masters in the art of loafing. But undoubtedly the most irritating quality of the average Japanese is his shilly-shallying tendency, his lack of any true business-like faculty. With the exception of a very few important firms in Tokyo, it is rare that work undertaken is executed in the time promised. The ordinary vendor will waste hours in bargaining before he condescends to come down to a fair price. It is all done in the best of humour, and usually in full expectation of the final compromise. If the buyer accepts the first-named price his money will be taken, but his character as a simpleton will be established.

Now, it is not for the love of the filthy lucre that the shopman or pedlar thus systematically over-rates his merchandise. It is simply from an innate delight in bargaining. For there is no sordidness as yet in the Japanese soul—none of that hunger after, and belief in, the almighty dollar, which is the growing curse of commercial peoples. Possibly the worship of gold is inseparable from the accumulation of material wealth and the fostering of the spirit of commerce. Sad if it be so, for hardly, then, will the Japanese, as he becomes commercial and business-like, escape the taint of mammon. And there is the more danger of this because of his tendency to exaggerate the material benefits of civilisation and to depreciate the elevating spiritualising influences that leaven the peoples of the West.

And yet our civilisation, although it has evolved a high moral and spiritual type that is unknown in Japan, has also produced a low brutal type that is rarely encountered there. It may fairly be questioned if the *average* moral tone of the Japanese is *markedly*, if at all, lower than that of Europe or America. From the very nature of the case such averages are difficult to make. Consider, for example, drunkenness. Except at New Year, flower festivals, and certain national holidays, an intoxicated man is very rarely seen in the streets. It has been whispered indeed, by the Japanese themselves, that there is a great deal of nightly boosing both in palace and in cot. But on this and on other questions of social morality it is impossible for a foreigner to speak with any authority. He simply does not know. From the absence of any strong public opinion against the vicious indulgences of mankind he is apt to draw the too hasty conclusion that morally Japan falls far short of the average level reached by us. But then what of the other side of the question? How do we as moral agents strike the Japanese? Were it not—I say it deliberately—were it not for the example of the missionary bodies, Greek, Roman, and Protestant, a native of Japan would, from his own observation of European and American life and manners in the East, have difficulty in finding evidence of a superior moral tone. To return, however, to our text, one thing is certain; into the inner heart of this sunny people, the foreign

eye has never penetrated. Friendly, very friendly are the Japanese with whom, in his day's work, the foreign resident mingles—pleasant, very pleasant is their intercourse. But there is no real intimacy, no heart to heart converse, no chumming together. In his Japanese friend's house the foreigner is an honoured guest. The deep springs of Japanese family life are hid from his view. Slight indications there may be occasionally that, though all is smiling, all is not smooth. Now and again social earthquakes occur in which a wife possibly is divorced for a mere caprice, but this is rare in the better ranks of society. To the stranger the good-humoured affability of a Japanese may often seem to be the outcome of a frank and confiding nature. But for keeping his own counsel there is not his superior on earth. Rarely does the countenance display the inner feeling of the soul. It is inscrutable. If not expressionless in repose, it is smiling. Then, his very politeness may compel him to hide a disagreeable truth, or at the utmost to express it in very indirect language. His native tongue, with its elaborate impersonal forms of address, and even of command, reflects the whole social sentiments of the people. It abounds in double negatives, in honorifics to the person addressed, in deprecatory phrases concerning self or self's belongings. To behave so as not to grieve others, to keep personal cares in the background, and to sympathise with others in their joys, are rules of conduct that find many curious illustrations and are sometimes strangely misunderstood by the foreigner. But there might be no end to such reflections. In a broad sense, the Japanese are like ourselves, very human. They are probably more callous to suffering and less susceptible to pain, and are not so overweighted with the responsibilities of life. But after a prolonged residence in the country, when the novelty has faded, and only a few characteristics retain their pristine freshness, the impression remains on the mind that to the Japanese, as to ourselves, life is grave. Their history abounds in tragic tales of heroism. The tragic still is, and, let us hope, the heroic too.

DEEP-SEA DEPOSITS.[1]

During the voyage of the *Challenger* the special charge of the samples of mud and ooze obtained from the sea-bottom was intrusted to Mr. John Murray, and one of the reports which Sir Wyville Thomson presented to the Royal Society during the cruise contains the first-fruits of his study of these specimens. During the sixteen years that have passed since that report was penned the subject has been gradually evolved from small beginnings, and its latest development is to be seen in the volume before us, which is second in interest to none of the long series containing the results of that memorable voyage. To give us

[1] *Report on the Scientific Results of the Voyage of H.M.S. "Challenger," during the years 1873-76. Deep-Sea Deposits.* By John Murray, LL.D. and Rev. A. F. Renard, LL.D. London, 1891.

accurate an idea of its contents as is possible within the limits of a few pages is the object of the present article.

The volume opens with a brief historical sketch of the progress of our knowledge of oceanography in general, and of the materials composing the sea-bottom in particular; and this is followed by a chapter describing the sounding machines, dredges, and other apparatus employed in collecting samples of deep-sea deposits, as well as of the routine method of examination and description which was found on the whole to be most suitable. First, the ooze or mud was examined microscopically both in the wet and dry conditions, special attention being paid to its physical properties; not the least important of these being colour, which often discriminates immediately between organic and inorganic deposits. This preliminary investigation was followed up by a more searching inquiry under the microscope, the deposit being first separated into portions containing particles of similar dimensions and specific gravity by a process of repeated decantation. In a certain number of typical cases the whole of the organisms present in the sample were isolated and their species determined.

The next process was the determination of the percentage of carbonate of lime, which was accomplished by decomposition of the deposit by hydrochloric acid in a carbonic acid apparatus in the usual way. By the previous inspection with the microscope the percentage composition of this carbonate of lime, as regards (1) Pelagic Foraminifera, (2) Bottom Foraminifera, (3) other organisms, was estimated. The insoluble residue was next examined, first as a whole and then after fractional decantations conducted upon a regular system. Three different classes of substances were separated by this process, which are termed respectively (1) Siliceous Organisms, (2) Minerals, (3) Fine Washings. Samples of each of these were mounted for examination under the microscope.

The second chapter is occupied almost entirely by a tabular statement of the results of this treatment as applied to the deep-sea deposits collected by the *Challenger*. These tables occupy more than 100 pages, and contain the bare facts upon which the greater part of our knowledge of these matters is based. It is impossible to exaggerate their importance, for they are, as a matter of fact, the only full analyses of a series of such deposits that have ever been published.

Chapter III. treats of "Recent Marine Formations, and the Different Types of Deep-Sea Deposits; their Composition, Geographical and Bathymetrical Distribution," and it is necessary to state that, in the compilation of this and succeeding sections of the work in which Messrs. Murray and Renard summarise the results of their labours, their conclusions are based not merely upon the *Challenger* collections. They have had the inestimable advantage of examining the specimens gathered together by practically all the deep-sea expeditions which have hitherto been despatched, and hence their generalisations rest upon a very wide basis indeed. The nature of the sea-bed as shown by every available sounding was marked down upon a map prepared on Lambert's equal-area[1]

[1] For particulars regarding this projection see this *Magazine*, vol. ii. p. 549, 1886.

projection, the boundaries of the different kinds of deposit were marked out, and then the area occupied by each was obtained by means of the planimeter.

Deep-sea deposits admit of a two-fold classification; from the point of view of their relative geographical and bathymetrical position they may be arranged in three groups: (1) Deep-Sea, (2) Shallow-Water, (3) Littoral; whilst with regard to their composition as well as geographical and bathymetrical range they may be divided into two categories: (1) Pelagic, (2) Terrigenous. These facts are indicated in the following table, which also gives the names proposed for the different kinds of deposits:—

MARINE DEPOSITS.

1. Deep-Sea Deposits, beyond 100 fathoms.	Red Clay Radiolarian Ooze Diatom Ooze Globigerina Ooze Pteropod Ooze	1. Pelagic Deposits, formed in deep water removed from land.
	Blue Mud Red Mud Green Mud Volcanic Mud Coral Mud	2. Terrigenous Deposits, formed in deep and shallow water close to land-masses.
2. Shallow-Water Deposits, between low-water mark and 100 fathoms.	Sands, gravels, muds, etc.	
3. Littoral Deposits, between high- and low-water marks.	Sands, gravels, muds, etc.	

The Red Clay occupies the greater depths of the oceans remote from land, covering over 51 million square miles, or more than one-fourth of the total area of the globe, and is probably the most characteristic of the deep-sea deposits: it is soft, plastic, and greasy to the touch, and presents, in fact, all the physical and chemical peculiarities of clays. Its basis appears to be hydrated silicate of alumina, and the view is adopted in the work that it has arisen from the decomposition of pumice and other volcanic materials spread over the floor of the ocean by aërial or submarine eruptions. Its most remarkable peculiarity is its almost total lack of carbonate of lime.

The Radiolarian Ooze, like the Red Clay, is found only in the greatest depths of the ocean; it consists, in fact, of a basis of Red Clay, with a considerable but varying proportion of Radiolarian skeletons mixed with it, so that no precise line of distinction can be drawn between the two species of deposit. The material brought up from the deepest sounding made by the *Challenger*, which took place between Papua and Japan, was a very typical example of this kind of ooze. It contained 80 per cent. of siliceous organisms and but little clay: 338 species of Radiolaria have been described from it. Hitherto no deposit of this kind has been met with in the Atlantic Ocean, and in the opinion of Messrs. Murray and Renard it is unlikely that it will be found there.

The Diatom Ooze, characterised by containing a considerable quantity of the frustules of diatoms, was found by the *Challenger* at only

five stations, all situated in the Antarctic region; it has since been discovered by the *Tuscarora* in the North Pacific, near the Kurile Islands. The purest specimens when dry are white and flour-like, resembling the Diatomite of fresh-water origin, though there are usually mineral particles present in sufficient quantity to give it a gritty feeling when passed through the fingers. This deposit appears to cover an area of some 10 million square miles in a zone of varying width surrounding the South Polar regions, and an undefined area in the North Pacific.

The GLOBIGERINA OOZE was probably the first of all the deep-sea oozes to be made known to the scientific world, for it appears that specimens of it were obtained by Lieut. Berryman of the U.S. Navy, and described by Ehrenberg and Bailey so long ago as 1853. It is defined as containing over 30 per cent. of carbonate of lime, principally made up of the dead shells of pelagic Foraminifera. It may be white, rose-red, or yellowish in colour, according to the nature of its inorganic constituents; when dry it is generally pulverulent. The carbonate of lime may be as much as 96·8 per cent. of the deposit, but on the average it is 64·47 per cent., the amount diminishing as the depth increases. The residue of the deposit, after the calcareous matter has been removed by acids, "consists of matters similar to those met with in a Red Clay, and having the same origin." Globigerina Ooze occupies all the medium depths of the ocean at a distance from land, especially where there are warm surface currents, its extension towards the north being only in the track of the Gulf Stream.

The PTEROPOD OOZE differs from the last-named deposit only in the larger proportion which it contains of shells of mollusca, such as Pteropods and Heteropods. It is found in its most characteristic form on the central ridges of the Atlantic, at depths not exceeding 1400 fathoms. The deposits laid down on the slopes of the continents at similar depths also contain considerable quantities of these Molluscan shells, but the distinctive features of the deposit are masked by the quantity of mineral particles which reach it from the shore.

We may now turn to the Terrigenous deposits, or those of which the materials are derived from the land. The formations laid down between the tide-marks, and in depths less than 100 fathoms, are not here considered; the remainder occupy an area of over 18 million square miles. These deposits are known as "muds," in contradistinction to the pelagic group, which have received the name of "oozes."

The BLUE MUD is by far the most widely distributed, occupying about 14 million square miles. When fresh it is of a blue or slate colour, with a reddish upper layer in contact with the water. The blue colour is due to the presence of organic matter which reduces the iron oxides present to the ferrous state, the red to ferric oxide produced by superficial oxidation. The mineral particles are derived, generally speaking, from the nearest land, and vary greatly in size according to their distance from the shore. Quartz particles are specially abundant.

The RED MUDS are found along the coast of Brazil, and owe their peculiar colour to the quantity of ochreous matter carried into the sea by

the Amazons and Orinoco, the amount of putrescible organic matter present being insufficient to reduce them to the state of blue mud. Similar deposits are reported to occur in the Yellow Sea, near the mouth of the Yang-tse-Kiang.

The GREEN MUDS and sands owe their special character to the mineral known as glauconite, which is formed *in situ* in the water, and deposited in the interior of shells. It occurs along bold rocky shores where but few rivers open into the sea.

The VOLCANIC and CORAL MUDS, as their names indicate, are found surrounding the oceanic islands of their respective categories, and consist of the detritus obtained from them.

The distribution of these deposits over the surface of the sea-bottom is exhibited in a map, in the preparation of which not merely the *Challenger* collections but also those of other expeditions have been utilised, in the manner indicated above.

The following table shows the estimated area occupied by each deposit, along with the percentage of carbonate of lime it contains, and the mean depth at which it is found.

	Mean Depth in Fathoms.	Mean percentage of $CaCO_3$.	Area in Square Miles.
Red Clay,	2730	6·70	51,500,000
Radiolarian Ooze,	2894	4·01	2,290,400
Diatom Ooze,	1477	22·96	10,880,000
Globigerina Ooze,	1996	64·53	49,520,000
Pteropod Ooze,	1044	79·26	400,000
Coral Mud,	740	86·41	2,556,800
Coral Sand,	176		
Blue Mud, etc.,	1016	19·20	16,050,000

The obvious diminution of the amount of calcareous matter in the pelagic deposits as the depth increases is one of the most important facts elicited by the expedition.

The next section of the Report treats of the "Materials of Organic Origin in Deep-Sea Deposits," and we are informed in the preface that it is mainly the work of Dr. Murray. After some remarks on the relations of the marine fauna and flora in general, we meet with a statement of the chemical reactions which are believed to go on between the dead organic materials and the sea-water. This is so concisely expressed, and the subject is one of such importance, that we cannot do better than quote the passage referring to it *in extenso*.

"The analyses of sea-water inform us that earthy and alkaline sulphates make up a very large part of the total sea-water salts. When these are exposed to the action of carbon, or of organic matter, which, of course, contains carbon, the sulphates are reduced, and sulphides formed; the carbon unites with the oxygen, formerly combined with the metal and metalloid, to form carbonic acid. Thus for every molecule of sulphate decomposed in this way, one molecule of sulphide and two molecules of carbonic acid are formed. As, practically, all the carbon of

marine organisms must thus ultimately be resolved into carbonic acid, the quantity of that acid produced in this way must be enormous, and cannot but exert a great solvent action not only on the dead calcareous structures, but also on the minerals in the muds on the floor of the ocean. Were these reactions to end at this stage, the bottom of the sea would soon become so poisoned by sulphides as to be unfit to support either animal or vegetable life. As soon, however, as the sulphides are produced, the carbonic acid, which is formed at the same time, decomposes the sulphides, forming earthy and alkaline carbonates, sulphuretted hydrogen being given off; the latter passing into the circumambient water is oxidised into sulphuric acid, which in turn decomposes the carbonate of lime dissolved in the sea-water or existing in the form of calcareous shells, sulphate of lime being finally formed. The nitrogenous or albuminoid matters present in animal tissues and fluids break up ultimately, by a series of complex reactions, into ammonia and nitrogen; the former is either liberated, or, combining with the carbonic acid, passes into solution as carbonate of ammonia, or becomes oxidised into nitrates. Further, the sulphur and phosphorus are given off in combination with hydrogen, becoming finally oxidised into sulphuric and phosphoric acids, which, decomposing the alkaline and earthy carbonates present in sea-water, give rise to sulphates and phosphates.

Murray and Irvine have shown by direct analyses that ammoniacal salts, formed as indicated by the above reactions, are everywhere present in the ocean, due to the decomposition of albuminoid matter, ammonia being always one of the products."

In spite of the opinion which has been expressed to the contrary, putrefaction appears to go on even at the greatest depths.

The different kinds of organisms are then discussed in some detail. The curious Coccoliths and Rhabdospheres are regarded as of vegetable origin; in the case of the Foraminifera only about a score of species are mentioned as belonging to the surface; yet so numerous are they individually as to make up 90 per cent. of the bottom deposit over which they live. The shells of crustacea are almost entirely absent from the deep sea, nothing having been found of the higher forms except the tips of the claws of crabs. Very remarkable, considering the shoals of fish that inhabit the ocean, is the scarcity of their remains; with the exception of otoliths and teeth, fish bones were dredged up on only three or four occasions. The sharks' teeth from the Red Clay of the Pacific, some of which belong to species now extinct, have already been often described, as also the ear-bones of whales, which occur along with them.

Of the organisms with siliceous skeletons the most important are Diatoms, Radiolarians, and Sponge-spicules, each of which is separately considered. With regard to the general questions of the relations of silica to marine life, the two most important matters advanced are, first, the suggestion that silica in suspension may be available for the use of animals as well as silica in solution, and, second, that siliceous skeletons are to some extent soluble in sea-water, which accounts for the absence of Diatom frustules and Radiolarian skeletons from places where we should otherwise expect to find them.

Chapter V. treats of the "Mineral Substances in Deep-Sea Deposits," which fall into three categories: (1) those derived from the crust of the earth; (2) those derived from extra-terrestrial space; and (3) those formed

in situ on the sea-bottom. Of the first class drifted pumice is the most widespread, and its importance as the origin of the greater part of the Red Clay has been already alluded to. The second group contains those minute globular magnetic bodies commonly known as "cosmic spherules." Their physical and chemical characters are fully described and the reasons discussed for attributing to them a meteoric origin. Though extremely minute in quantity, they are of great interest from their bearing on astronomical science.

The third group, comprising the minerals formed at the bottom of the sea, is the subject of a special chapter. Of these the most important are the manganese nodules and the glauconite casts. With regard to the former, the view is defended that they are concretions round nuclei of various kinds, the manganese being derived chiefly "from the decomposition of the more basic volcanic rocks and minerals with which the nodules are" associated. The glauconitic grains appear to be formed in the interior of calcareous shells, whilst the larger and more irregular ones are believed to have grown upon a nucleus which was originally so produced.

An account is also given of the minute crystals of the mineral Phillipsite, found in the deepest parts of the oceans, and apparently due to the decomposition of volcanic rocks.

The body of the Report is followed by three appendices, the first of which explains the signs used in an extensive series of maps and charts illustrating the soundings made during the cruise; the second is an elaborate analysis of the manganese nodules, with special reference to the occurrence in them of the rarer elements, by Dr. John Gibson; whilst the third contains a large number of different analyses by Professor Brazier, the late Professor Dittmar, Dr. Sipöcz, and other chemists.

In addition to the maps and charts, the monograph is illustrated by twenty-nine plates, which for beauty of execution are not surpassed by any that have appeared in earlier volumes of these Reports. It is impossible to give them higher praise than this.

In concluding this brief summary it may be pointed out that the volume before us contains the first attempt which has yet been made to deal on broad lines with the vast subject of submarine geology. Of the importance of such a work to the whole scientific world it is scarcely needful to speak. It forms a rich storehouse of facts which cannot be neglected by those who study either the history of the earth in the past, and the changes which are taking place in it at present, or the general biological problems involved in the relation of marine animals to their environment.

WILLIAM E. HOYLE.

PROGRESS OF THE INDIAN SURVEYS, 1875 TO 1890.[1]

All who are interested in operations ranging on the scientific side of Indian administration, and the number of such in England and elsewhere must be increasing yearly, will doubtless greatly appreciate another issue of the series of Memoirs begun by Mr. Clements Markham, which enables much information to be obtained from a comprehensive compilation, and saves the need of tedious reference to many volumes of annual reports. Mr. Black also deserves well of the officers engaged on surveys and other kindred operations in India (from which much labour, both mental and physical, is inseparable) for having compiled this convenient record, which ought to do much towards bringing to these undertakings the well-merited recognition of their scientific value. It is to be regretted, however, that the compilation should have been so long deferred as to embrace a period of fifteen years, during which many operations have been initiated and have passed into history. Also, it may be said that a memoir of this kind, which can be made useful in awakening an interest in current undertakings, will fail in this part of its object unless a succeeding volume is presented so as to give early information how these undertakings have prospered. Perhaps, therefore, Mr. Black may find it practicable to repeat the Memoir at a shorter interval, while the recollection of what is found in the present volume remains fresh.

The present volume has a suitable frontispiece in a photo-lithographic reduced copy of Colonel Tanner's beautiful picture of part of the snowy range on the north-west frontier of Kashmir, bringing pleasing recollections to all who were favoured to see the collections of this talented officer's drawings which appeared in the Calcutta Exhibition of 1883, and in the Colonial and Indian Exhibition (in London) of 1886. The copy has been executed by a private firm in London, and is quite to be commended as an artistic picture with fairly good effects obtained from tinted printing; but a more appropriate frontispiece might have been found in a picture executed in the Calcutta Survey Office by the process of photo-etching, which, as is shown at page 227 of the Memoir, has been brought to great perfection by Colonel Waterhouse, and of which some specimens have already appeared in Colonel Thuillier's *Annual Reports of the Survey Department*. Similarly, an example of the cartography, drawing, and printing done in the Calcutta office might have been given in the Map of India, in place of the map printed in England which illustrates the Memoir. A map published in Calcutta, besides serving as a specimen of Indian work, would also have been acceptable as a more reliable record of existing facts, with regard to which the English map, in the one observed particular of the want of colour over Baluchistan to indicate its political position as dependent on the Indian Empire, seems to be faulty.

The contents of the Memoir are ranged in sixteen Chapters, by group-

[1] *A Memoir on the Indian Surveys*, 1875-1890. By Charles E. D. Black. London: Edward Stanford, 1891. *Price* 7*s.* 6*d.*

ing which a better general comprehension may be formed of the several Departments whose operations are treated of, thus :—

Chapters I. and II. The Indian Marine Surveys.
„ III. to XI. The Survey of India, in its various branches and operations, both field and office.
„ XII. The Geological Survey of India.
„ XIII. Indian Meteorology.
„ XIV. Statistical Survey of India.
„ XV. Archæological Surveys.
„ XVI. Geographical Work of the India Office.

From this list the absence of the Revenue Surveys of Madras and Bombay is to be noted, and Mr. Black may find it practicable to add to any future Memoir he may publish a record of what has been done in these undertakings, which, although they have been carried on mainly for the purposes of Revenue assessments and for the demarcation of boundaries, have executed work of a very important character, and have likewise furnished some useful topography. A complete history of these Surveys would be desirable, as it is understood that the operations of both will shortly be brought to a conclusion. There is an absence also of any mention about the Forest Surveys, carried on in connection with the Forest Department, which are known to have furnished maps of general utility and of a high-class character.

The remarks on the subjects of the Memoir will be made as brief as possible, merely indicating some of the prominent features in each of the operations.

The Indian Marine Surveys, since their re-institution in 1875, have been prosecuted at various parts of the coast, where charts are now required in greater detail than was necessary when the coasts of India and Burma were first surveyed. A list is given of the ports and other parts of the coast-line still awaiting revision, and it is shown that the work will occupy the existing establishments for forty years, but it is mentioned that an increase in the establishments is in contemplation, which in the interests of the increasing coast navigation is certainly to be desired.

In the first of the chapters on the Survey of India there is a concise historical account of the Great Trigonometrical Survey from its initiation in 1800, describing its scope and general plan, and showing how the operations have been made not only to serve for the practical purpose of furnishing a skeleton basis on which all the maps of the country are constructed, but also to include the investigations of geodesy, and of the variations of the force of gravity. This is well worthy the attention of all who wish to have a good general idea of this vast undertaking. The design of the Trigonometrical operations for India proper is shown to have been completed, but it has been extended by the annexation of Upper Burma and by the assumption of a British Protectorate over Baluchistan.

The Topographical Surveys, which are mainly confined to Native States, and executed on different scales, as may be determined by military requirements, are shown to have been carried on in many internal parts of the country, but they are also being vigorously extended over frontier

territories. The record points to much hard work of a very difficult and harassing character.

The Memoir indicates a great change which has been introduced into the character of the Revenue Surveys done by the Survey of India in the North-West Provinces and in Bengal, where, under the name of "Cadastral Surveys," and on a largely increased scale for the maps, the operations include the mapping of the holdings and the preparation of a record of the occupancy rights of the cultivators. To the Survey establishments has thus been assigned a large part of the duties hitherto performed under Civil Judicial officers, and the change is shown to have resulted in a very considerable reduction in the cost of the combined operations of Survey and Settlement. In Burma the Survey of India also carries on Cadastral Surveys, but the same civil duties have not yet been performed there as in the other provinces, on account of the imperfect acquaintance of the Indian Surveyors with the Burmese language.

The chapter on "Geographical Surveys and Explorations" is full of interesting particulars concerning the enterprise of the Surveyors during the wars in Afghanistan of 1878 and 1880, when under great difficulties a large amount of excellent sketching was executed, resulting, with other materials soon after obtained, in a fairly complete map of the country. In this chapter, also, will be found accounts of the journeys made in frontier territories beyond Kashmir and in Tibet by the now famous trained native explorers, who are sent out in various disguises on routes roughly indicated to them beforehand, and through whose daring and perseverance much geographical information is now possessed of hitherto little-known regions. The chapter likewise shows how a beginning was made of obtaining some topographical knowledge during military expeditions in the outlying tracts of the new territory in Burma when still in an unsettled state, preliminary to the future final survey, which may have to be deferred for years while more pressing surveys are carried on in the central tracts.

The chapter on the "Afghan Boundary Commission," during which the Indian Survey officers had the opportunity of exhibiting more than ordinary enterprise, and when, as Mr. Black remarks, "an enormous addition to our knowledge of Northern and Western Afghanistan was made by the labours and researches of the Boundary Commission which was engaged in conjunction with the Russian Commission in laying down the boundary of the country, in 1884-86," is especially valuable, no complete official account having been written and the compilation being taken by Mr. Black from various published sources. The compilation includes many interesting descriptions of various parts of the country visited by the Surveyors; but, unfortunately, Mr. Black's map of the Indian Empire has not been made sufficiently comprehensive to allow of the country covered by the Commission being fully traced.

The "Tidal and Levelling Observations" described in Chapter VIII. are two distinct operations, executed each for a separate practical purpose, though combined they serve for certain scientific investigations. They have been carried on conjointly by one establishment under one head, and the combination of the separate results shows that the officers of the

Survey of India are on the alert and ready to employ for the advancement of science all suitable facts coming under their knowledge. In the present case, the combination of results has led, among other investigations, to the discussion of the reasons for the difference between the mean level of the sea at Bombay and at Madras as ascertained by the two operations Tidal gauges have been set up at most of the ports on the Indian Coast, and the tide tables which are published after a complete set of observations has been taken, lasting over five years, are said to have given very general satisfaction. The explanation of the calculations for the prediction of the tides are full of interest; also, the description of a tide-predicting machine—the invention of Mr. Edward Roberts of the Nautical Almanac Office—which is said to execute calculations in about two hours which would by ordinary means occupy from four to five months. In connection with the Levelling operations one line of levels is mentioned, starting from Karachi, running by the Indus Valley, then through the Punjab, North-West Provinces, and Bengal, to False Point on the Bay of Bengal, in length 2300 miles, probably the longest line of levels ever run, which closed with an error under 9 inches per 1000 miles.

Chapter IX., on "Geodetic Observations," minutely describes a purely scientific operation of the Survey of India for the determination of differences of longitude by a combination of astronomical observations with signals through the electric telegraph, to be used mainly for investigations of the figure of the earth. This system is also shown to have been used as the means of determining the true longitude of the Madras Observatory with reference to Greenwich. The Madras Observatory is a highly important point in the mapping of India, and its longitude, hitherto based entirely on astronomical observations, has been found by the recent telegraphic determination to have a probable error of 2 seconds of time, or 30·57 seconds of arc.

Chapter X. furnishes particulars regarding the "Supply of Scientific Instruments" from the India Store Department in London, where the instruments, on being received from the manufacturers, are tested and examined, prior to despatch to a depôt in Calcutta kept up in connection with the Survey of India, whence they are distributed to many Government departments.

Chapter XI., with the title "Headquarters of the Survey Department," gives much interesting information about the drawing of maps and concerning their publication by the several processes of copper-plate engraving, heliogravure, photo-etching, photo-zincography, and lithography —all practised in the Survey of India Offices in Calcutta, as found to be most suitable to the subjects or requirements in the prints. This is a most instructive chapter, showing the great variety and extent of map-printing which is done in Calcutta. In this chapter, also, space is found to describe the work at the branch office at Dehra Dun, where the final mathematical computations of the Great Trigonometrical Survey are completed, as well as some map-drawing and map-printing, and where there is a small observatory for solar photography.

Much may be learnt of the geology of India and of many of the mineral deposits of the country from Chapter XII. of the Memoir, which

treats in considerable detail of the large amount of work done during the period under review by the Geological Survey of India, both of final systematic examination and geological mapping and of specially called-for reporting in mineral fields. Rapid inspections in the newly-acquired territories of Burma and Baluchistan, and in Afghanistan, during the temporary occupation of that country, are also shown to have been carried on and much useful information obtained. The final examination of the country is proceeding systematically, and about half of India proper is estimated to be finished; but Baluchistan is almost untouched; also, there remain certain parts of the Himalayas east of Garhwal, and of Burma, including enormous tracts of wild country forming the outer eastern borders of the Province and those lying between it, Assam, and Bengal. A manual of geology for India is mentioned as having been published in 1878, supplying the much-felt want of a general view of the accumulated knowledge which, till then, could only be found in detached papers and reports.

The very great progress which has been made in India since 1875 in the science of meteorology is well exhibited in Chapter XIII., which treats of Indian meteorology, and which gives ample proof of the high talents of the officers of the Meteorological Department and of the liberal encouragement the Department receives from the Government. The descriptions of the continuous improvements which have been introduced in the systematic recording of meteorological facts at stations selected by experience, and of the manner in which the facts are now rapidly investigated at central offices, so as to give immediate intimation of impending and alarming changes in the weather, fully indicate the present high efficiency of the Department, and how it labours to meet the requirements of the public. Of its publications, which have been received with much favour, may be mentioned the daily weather reports and charts for the Bay of Bengal issued at Calcutta, similar reports and charts for the Arabian Sea issued at Bombay, and others for India generally issued at Simla. The Memoir also shows that many of the officers have written papers of high scientific value.

The "Statistical Survey of India," forming the subject of Chapter XIV., has embodied inquiries into the topographical, ethical, agricultural, industrial, administrative, and medical aspects of each unit of Indian administration—the district—of which there are 240 throughout the country. Local officers furnished to provincial editors the required statistics, which, in the first instance, were published in bulky volumes by provinces, and then afterwards were reduced under the Director-General of Statistics to a practicable size for general reference, and finally published as the "Imperial Gazetteer," in nine volumes. There is a short discussion on the transliteration of Indian names into the English character, for which a uniform system was introduced, to be used in the published volumes of this survey and to be adopted for all maps and other publications of the Government.

During the period embraced by the Memoir, much activity has been displayed in archæological research throughout India, and Chapter XV., on "Indian Archæological Surveys," furnishes very comprehensive details

of what has been effected under the fostering care of the Government, besides giving many interesting particulars of historical retrospect of what had previously been done to a large extent through the personal efforts of distinguished Indian archæologists. The vastness of the field in India for archæological research is amply testified by the present volume, and although many of the better-known antiquarian objects have been examined and described on previous occasions, most of them have been again visited during the period under review, and new facts ascertained regarding them. Many other objects are now described for the first time—some have only recently been discovered—and in the Memoir, or in the larger illustrated publications to which reference is made, much will be found to attract to the study of India of ancient times—by no means the least of the many attractions of our great dependency. The rock-cut temples are of world-wide fame, and singly they have long been the subjects of description and popular illustration. Now they have been included in a special series of artistically-illustrated reports, in which the caves, singly or in groups, have been assigned to their respective constructors, whether Buddhists, Brahmans, or Jains, and the complete list shows that there are over a thousand examples of these caves throughout all India, though most of them are in Western India. Another recent undertaking of the Archæological Survey is the collation of copies of all ancient inscriptions, which include those on rocks, on pillars, on walls of temples or plates of copper, and which may either be regal edicts or title-deeds of grants made by kings and chiefs to temples or religious communities. The copies (with translations) form a series of special reports issued by the Survey. Lastly, in Burma a systematic search is being made for ancient manuscripts, which already has been so far successful as to have led to a collection in the Free Library at Rangoon of a large number of splendid manuscripts in various characters peculiar to the Province or to the countries on its borders. Along with the collection of manuscripts, archæological research has been carried on, and some reports have been issued with lists of antiquarian objects in Lower Burma; but much yet remains to be done in this Province. Besides the examination of the antiquarian remains of India, the important step has lately been taken of adopting systematic measures for their preservation, to which the Secretary of State was urged in a memorial signed by many of the most eminent statesmen and men of letters of the day, and in connection with which lists drawn up for each district have been obtained, specifying (1) those monuments which, from their present condition, ought to be maintained in permanent good repair; (2) those which it is now only possible to preserve from further decay; and (3) those which, from their advanced stage of decay, it is impossible to preserve. Much good work has been done on a moderate expenditure, and due provision has been made for keeping up the monuments of classes (1) and (2).

Chapter XVI., on "Geographical Work at the India Office," explains how the geographical records are cared for in London, and mentions the good work done by able officers who successively have had charge of them. Notably, the services of Mr. Clements Markham are spoken of, to

whom is due the inception of the first of the series of Memoirs of which the present issue has well sustained the high character of its predecessors, and with regard to which a hope may be again expressed that Mr. Black will renew the issue after a shorter period than fifteen years.

JAMES SCONCE, *Colonel.*

GEOGRAPHICAL NOTES.

BY W. A. TAYLOR, M.A.,

Assistant Librarian, R.S.G.S.

EUROPE.

Meteorology of Scotland for 1890.—The tables for the year 1890 are published in the *Journal of the Scottish Meteor. Soc.*, Third Series, No. viii. The mean pressure of the air was only ·17 inches higher than the average of the preceding thirty-four years, while the mean shade temperature was 46°, or ·4 above the average. The rainfall alone showed a marked deviation, being 3·4 inches in excess, but, as the returns from the eight chief towns still show a slight falling off, this excess is probably due to the establishment of wet country stations.

Observations of Dust-particles at Ben Nevis Observatory.—In February 1890 a grant was made by the Royal Society for the purpose of supplying the Ben Nevis Observatory with apparatus for counting the number of dust-particles in the air. Two instruments, one portable and another of larger dimensions, were made after designs by Mr. Aitken. With the latter observations may be made at any time, except when the wind, blowing from the south-west, pollutes the air above the inlet pipes with smoke from the observatory and hotel. Since February 1891 observations have been made every third hour. Some of the results are given, and their bearing discussed, by Mr. Angus Rankin in the *Journal of the Scottish Meteor. Soc.*, Third Series, No. viii. It may be stated that a number of particles under 100 in a cubic centimètre of air is phenomenally small, and a number over 4000 phenomenally large. The highest number was 14,400, which was counted in April 1891. The particles are most numerous during March, April, and May, when easterly and south-easterly winds are prevalent both at sea-level and on the summit of the mountain. On the other hand, when the winds on Ben Nevis blow from the north-west, north, or east, their directions diverge most from those of sea-level winds, and then the dust-particles are most scarce. Hourly observations were made only on four days, but the three-hourly means show the general trend of the daily curve. The means for the three months, March to May, show a minimum, 526, at 4 hours, and a maximum, 1438, at 16 hours, the absolute mean for the three months being 854. The variations seem to be due to the movements of the first or lowest, cloud stratum. In the morning this stratum lies below the summit of Ben Nevis, but towards noon rises and envelopes the top, hovers above it in the afternoon, and sinks to its original position about midnight. Several points remain to be cleared up. Apparently only the free dust-particles are counted, and few, if any, of those on which moisture has condensed to form visible fog: all the lowest values have been recorded when a thin mist enveloped the top. These observations will be of great service in the study of clouds—their forms, heights, and motions. The bearing of dust on the humidity of the air is also an important point; at present the humidity of the Ben Nevis atmosphere is very little understood.

Italian Statistics.—Professor Luigi Bodio, Director General of Statistics, has published an interesting volume entitled *Di alcuni Indici misuratori del Movimento Economico in Italia*. A few extracts may be given from the chapters dealing with subjects most nearly connected with geography. The author divides emigrants into two classes—those who go abroad for a limited time in search of employment, and the permanent emigrants. The former amounted to about 100,000 annually, while the latter increased in number from about 20,000 in 1876 to 196,000 in 1888. In 1890 the number fell to 105,000. Except in 1888 the emigration proportionally to the total population has been considerably below that of Great Britain. The large majority of the emigrants go to America, being nearly equally divided between the United States and South America.

The table of deaths from infectious diseases shows a very high mortality from small-pox, measles, diphtheria and croup, typhoid and malarial fevers. This is due to the insanitary conditions of many towns and villages, and to the impurity of the drinking-water. It is, however, gratifying to see that the deaths, particularly from small-pox and diphtheria, have fallen very rapidly during the years 1889-90.

The statistics of agriculture can only be regarded as approximate, owing to the absence of a complete cadaster of lands under cultivation, and the incorporation of Rome and Venice in the Italian territory renders a comparison with earlier years very unreliable. On the whole there seems to have been a diminution during recent years in the production of wheat, and, to a smaller degree, of Turkish wheat. The cultivation of rice is evidently on the wane, and the production of wine shows a falling off in the more recent years, particularly in the bad season of 1889. The mining industries are being satisfactorily developed, the production of steel advancing with most marked rapidity. Italy occupies the first place among European nations in the production of raw silk, but is rather behind in the manufacture of silken goods. Cotton-spinning is spreading, especially in Northern Italy. In June 1891 there were 8245 miles of railway in operation, besides 1577 miles of steam tramways. The average net profits are about 2 per cent. only, but this average is low owing to the railways of Sicily, which yield a small return, and those of Sardinia, which are worked at a loss. The above are only a few of the subjects dealt with in Professor Bodio's work. The tables comparing Italian statistics with those of other countries are particularly interesting.

Kazan and Astrakhan.—The Belgian Consul-General at Moscow gives the area of the Kazan Government as about 15,745,000 acres, of which nearly one-half is under cultivation, and over one-third forests. There are also about 1,837,900 acres of pasture-land. The principal cereals grown are rye and oats, and in 1889 the mills ground 388,000 tons of grain, yielding flour and bran to the value of about £303,000. The Government contains also 183 factories and workshops, comprising soap-works, spinning and weaving factories, and tanneries. In the first half of this century Kazan was a great centre of the corn trade, and was also an entrepôt for goods from Siberia and the Ural Mountains, but, since steam navigation has been developed on the Volga, the trade in cereals has been transferred to Rybinsk, and most of the Siberian and Ural goods are now sent to Nijni Novgorod.

The population of the vast Government of Astrakhan (86,490 square miles) reached, in 1890, the number of 847,716. It is composed of three races—Tartars, Kirghis, and Kalmucks. The Kirghis, numbering 219,594, inhabit the steppes on the left bank of the Volga. The nomadic Kalmucks are engaged chiefly in stock-raising, but are also employed in fishing and salt-working. There are 139,342 Kalmucks, and their herds, in 1890, were composed of two million animals—sheep, oxen, horses, and camels. This people and the Tartars extract salt from the lakes, which

are leased by the Government for one or five years. In 1889 more than 309,000 tons were extracted. The most important works are those of Lake Baskuntchat, not only on account of the excellent quality of the salt, but also owing to a railway connection with Vladimirofka, on the left bank of the Volga.

The Caucasus.—In 1890 M. Krasnoff made an expedition to the Caucasus, and Svanetia in particular, to observe the flora, geological formation, etc. He has collected 3000 specimens of plants, including a peculiar variety of oak. A striking feature is the poverty of the Alpine flora, though lowland forms are found up to a height of about 8200 feet. On the southern side the lower limit of snow and the upper of forest are at a lower elevation than on the northern slope of the mountains, the difference amounting in the case of the forest to nearly 500 feet. On the border of Svanetia and Abkhasia the snowfields extend downwards till they almost reach the forest. Traces of the Glacial Period are found over large areas. The whole of Svanetia was covered with ice, and the terminal moraine of the old Rion glacier lies only 13 miles from Kutais.—*Deutsche Rundschau*, xiv. Jahrg. 5 Heft.

ASIA.

Railways in Japan.—The last section of the Japanese north-eastern railway has been opened. The whole distance of 454 miles from Tokio to Aomori is now traversed in 28 hours, and the capital is placed in rapid communication with Yezo, which is separated from Hondo by the Tsugaru Strait, only 70 miles broad. When the line now being constructed from Kobe to Shimonoseki is finished, the island of Nippon will be traversed from one extremity to the other by a railway about 1000 miles in length.—*Boll. della Soc. Geogr. Italiana*, Nov. 1891.

Consumption of Opium in India.—In answer to a memorial from the Society for the Suppression of the Opium Trade a *Blue Book* has been issued, containing reports on the subject from a number of Indian officials. These letters show that the memorialists have not distinguished between shops where opium is sold for medicinal and other purposes and the true opium dens, where preparations of the drug are smoked on the premises. It is generally admitted that opium-smoking is prejudicial to the health and degrading to the morals, but most of the authors of the reports believe that the evil would be increased by the closing of the licensed shops, for the number of unlicensed dens beyond the control of the police would be largely augmented. In the opinion of some, alterations in the regulations respecting the quantity of opium an individual may have in his possession would assist the police in the suppression of illicit traffic. The increase in the revenue derived from opium does not indicate an extension of its use, but is a consequence of higher duties and a more efficient control of its sale. Opium eating and drinking are on quite a different footing. Though, no doubt, sometimes carried to excess, the practice is beneficial in feverish districts and in cold weather. *Bhang*, a potable preparation of hemp, is harmless; and *ganja* is smoked almost exclusively by *fakirs*. The cultivation of poppies might be suppressed; but smuggling from Nepal and other countries, accompanied by all the evils connected with contraband trade, would thereby receive a great impetus. The conclusion seems to be that no better plan can be adopted than the one now in force—namely, to discourage the practice of smoking opium by making it expensive, until such time as, owing to improved habits and the growth of public opinion, the dens may be closed altogether. This has been done in the Punjab, and in Upper Burma no licences have been granted.

The Coal-Fields of Sumatra.—This island is traversed from one end to the other by a mountain range named Bukit Barisan (Chain Mountains), which in places splits up into two to four parallel chains. These are in many places connected by transverse ridges, giving rise to elevated plateaus. Volcanoes are numerous, the highest being Indrapura (12,100 feet), which forms the culminating point of the island, but none has wrought so great devastation as Merapi, 9600 feet high. Between Merapi, Singalang (9640 feet), and Sago (4920 feet), in the north, and the active volcano Talang (7460 feet), in the south, lies the beautiful lake of Singkarah, at a height of 1187 feet above sea-level. It has a periphery of more than 600 miles, is fed by numerous streams, and abounds in fish. At its north-eastern corner its surplus waters are carried off by the Ombilien river, which, owing to its swift current and numerous cataracts and rapids, is not navigable even by native boats until it reaches Telaweh. After receiving numerous tributaries it assumes, near the edge of the Padang uplands, the name of Kwantan, and still further down that of Indragiri, under which it reaches the east coast. About twelve miles east of Singkarah Lake this river enters a sandstone region rich in coal-seams, through which it flows for a distance of six miles. Here is the Ombilien coal-field, which Herr H. Zondervan in the *Deutsche Geogr. Blätter*, Bd. xiv. Heft 4, following the engineer Verbeck, divides into three parts. Of these the Sungei-Durian, stretching from the Ombilien to its tributary, the Sungei-Lassi, can be most easily worked, owing to the greater continuity of the strata. The coal is very valuable from the large proportion of carbon it contains, and trials on the steamer *Sumatra* have proved that 13 tons have an equal heating-power to 21 of Borneo coal. It has very little foreign matter and sulphur, and therefore leaves hardly any ash. How to provide efficient means of transport to the coast is a problem which has long engaged the attention of the Dutch Government and its engineers. Proposals have been made to construct railways to the highest navigable points of the rivers on the east coast; but the country is yet unsettled, and the west coast is only about thirty miles from the coal-fields. In this case there is a choice of three passes, one near Padang-Panjang, to the north of Lake Singkarah, 2460 feet high; and the Subang and Pakan Achad to the south, 3000 and 3930 feet high, respectively. The first has been chosen on account of the fewer difficulties to be overcome, though the distance is longer, and a railway is being constructed, 105 miles in length, from Brandewyns Bay, south of Padang, with a branch to Fort de Kock. Its estimated cost is about £124,000, besides which over £116,000 must be spent in constructing a harbour at Brandewyns Bay. The receipts on the section from Padang to Padang-Panjang, which has been open since the commencement of last year, show that the line will be of great service to the country through which it passes as well as to the coal-fields. The population of the lowlands and uplands of Padang, numbering about a million, are engaged in agriculture, producing considerable quantities of coffee and rice. The uplands yield also tobacco, sugar, sago, gambier, nutmegs, etc.; and the lowlands indigo, *copra*, and oil.

AFRICA.

The Trade of Cape Colony.—The imports for 1891 amounted in value to £8,582,776, as against £10,106,466 in the preceding year. The gross exports exceeded the imports by nearly £3,000,000. A considerable extension of business is anticipated in 1892. The export of diamonds has kept steady, while that of gold nearly doubled itself. The value of gold exported in 1891 was £2,781,576.—*The Colonies and India*, Feb. 6th.

Population of South African States.—The *Star* of Johannesburg, January 2d, publishes the following table, compiled from the last census returns and other sources by Mr. Fred. Jeppe :—

I.—British Possessions and Protectorates.

Territory.	Area in Sq. Miles.	Population. Whites.	Blacks.	Total.	Density of Population per Sq. Mile.
Cape Colony,	221,311	376,987	1,150,237	1,527,224	6·90
Natal,	20,461	46,788	497,475	544,263	26·60
Br. Basutoland,	10.293	578	218,324	218,902	21·27
Br. Zululand,	8,600	600	142,000	142,600	16·58
Br. Bechuanaland,	70,000	5,254	55,122	60,376	0·85
Br. Protectorate,	92,000	500	111,000	111,500	1·215
South Zambezia,	100,000	1,000	150,000	151,000	1·510
Total,	522,665	431,707	2,324,158	2,755,865	5·27

II.—Independent States.

S. A. Republic,	113.642	119,128	560,000	679,128	5·98
O. F. State,	48,326	77,716	120,787	207,503	4·30
Swaziland,	6,152	1,000	60,000	61,000	9·91
Tongaland,	1,170	...	100,000	100,000	...
Pondoland,	4,633	50	200,000	200,050	43·18
Total,	173,923	197,894	1,049,787	1,247,681	7·17

III.—Portuguese Possessions.

District L. Marques, (part of Mozambique),	15,000	1,500	100,000	101,500	6·68

IV.—German S. W. African Protectorate.

	322,432	539	199,461	200,000	0·62
Grand Total,	1,034,020	631,640	3,673,406	4,305,046	4·16

Katanga.—*Le Mouvement Géogr.*, No. 3, 1892, describes the expedition of Lieutenant Paul Le Marinel to this country. He traversed the basins of three important rivers—the Sankuru, the Lomami, and the Lualaba. The basin of the Sankuru extends farther to the east than has hitherto been supposed, for, at about lat. 6° S., its upper course, the Lubilash, receives an important tributary, the Luembe, the drainage-area of which extends as far as 24° 30′ eastwards. The expedition crossed the Lubilash on Feb. 17th in lat. 8° S., where it was eighty to ninety yards broad, and had a feeble current. Rocks obstructed its course, rendering navigation impossible. The source of the Lomami (trib. of the Congo) was discovered in 8° 45′ S. lat. and 24° 55′ E. long., where it issues from a large marsh. Two and a half miles from its source it has a breadth of ten yards and a depth of five feet. From this point to 6° 10′, where Cameron's exploration ended, its course has not been investigated. Its total length may be estimated at 645 miles. Its basin is peculiar, extending over nearly ten degrees of latitude and never exceeding one of longitude. It seems to have no affluents of importance except the Lurimbi and the Lukasi.

The Lualaba was crossed on the outward journey in lat. 9° 55′ S. and long. 25° 38′ E., and on the return journey at 9° 12′ S. lat. and 26° 8′ E. long. The elevations of these points were 2590 and 2165 feet respectively. This fall of 425 feet in about fifty-five miles argues the existence of formidable rapids, and such, according to the natives, exist, being called by them the rapids of Kalengwe : above the upper crossing-place are the rapids of Shilo. The height of Nyangwe is 2033 feet above sea-level, and, as the river therefore falls little more than 130 feet in about 430 miles below the lower of the above points, it may be hoped that no obstacles to navigation occur on this section. Between the camp at Lusamba (1738 feet above sea-level), on the Sankuru, opposite the confluence of the Lubi, to the Lualaba the country is in general flat, the watersheds being scarcely distinguishable. The highest relief is the district in which lie the sources of the Lomami, where an elevation of over 3700 feet is attained. To the south of this plateau lies the country of Samba, where numerous small lakes occur at elevations of 3000 to 3600 feet, while to the east the land slopes down to the valley of the Lualaba. Between the Lualaba and its eastern tributary, the Lufira, a chain of mountains was crossed, having summits 4400 to 5400 feet high. Samba Lieut. Le Marinel describes as a very delightful country, abounding in large trees with dense foliage, short juicy grass, and fine pieces of water. Game, large and small, animals of prey, birds and insects are very numerous.

The Rovuma.—In May, June, and July of 1891 Lieutenant von Behr made an expedition to the "coal-fields" of Itule, and descended the Rovuma from long. 38° 10′ to its mouth, a distance of 40 geographical miles. Starting from Mikindani, a town containing 2000 to 3000 Arabs, Hindus, Baluchis, and natives, he gradually ascended to the Makonde plateau, 1800 feet high, and passing through Newala reached the Rovuma. Having engaged two native boats, he ascended the stream, and passed the first rapids on May 24th. They are caused by a chain of mountains which, about 38° 20′ E. long., runs along the river, and ends in the Kisulwe mountain. Below this mountain the river divides into four arms, and forces its way through blocks of stone and islands overgrown with reeds, re-uniting again at about 38° 25′ E. long. Lieutenant von Behr gave them the name of Peters' Falls. The country between the Lujende and Rovuma is inhabited by Zulus, who call themselves Wagoni and belong to the Yao tribe, which dwells on the eastern shore of Nyassa and in the neighbourhood of Massasi and Newala. They use assegais, and the oval shield of the Zulus, covered with raw hide, is still found among them. The Lujende at its confluence with the Rovuma is 160 to 200 yards broad, and has a current of nearly 100 feet per minute with a depth of 3 to 5 feet, whereas the Rovuma is only 100 to 160 yards broad and about 3 feet deep. Above the confluence the Rovuma can be navigated only for a very short distance, even in canoes, and, therefore, just below Makochira Lieutenant von Behr was obliged to turn back. Below the mouth of the Lujende the current was nearly 2¼ miles per hour. The banks are high and deeply eroded, and marks on the trees show that in the rainy season the bed of the river is filled with water. The tributaries are insignificant, carrying water only in the wet season. Below Newala the bed widens out, and sandbanks and islands are formed, becoming more numerous as the mouth is approached and forming insuperable obstacles to navigation in European vessels.

AMERICA.

Progress of British Columbia.—*The Colonies and India*, Jan. 23rd, quotes figures from the last *Annual Report of the British Columbia Board of Trade*, showing the progress made by the Colony in commerce and industry. The exports

have risen in value from £371,610 in 1872 to £1,251,431 in 1891. The imports, which in 1872 were of the value of £353,413, were estimated in 1891 at £1,067,238. The figures relating to particular articles of export are also given. The real and personal property in the city of Victoria was valued in 1891 at £5,300,000; in Vancouver at £2,840,000; and in New Westminster at £2,000,000. A great development of agriculture is expected to arise from the opening of the Shushwap and Okanagan railway. This line will also approach the rich mining region of Kootenay, the progress of which has been retarded by want of means of transport. A considerable quantity of coal was exported, but there are still many valuable deposits on Vancouver Island and at adjacent points still untouched.

Sponges in the Bahamas.—The collection of sponges along the coasts of these islands is a very profitable occupation. About 500 vessels, of 5 to 25 tons each, and 6000 men are engaged in the fishery, which is pursued at all times of the year, though little is done in August and September on account of the hurricanes. The boats stay out for six weeks at a time; 5000 large and 7000 small sponges are considered a good catch. A market for this article is held five times a week at Nassau in New Providence.—*Globus*, Bel. lxi. No. 6.

Commerce of Yucatan.—A correspondent speaks in the *South American Journal* very favourably of the economic resources of this country. Henequen (Sisal hemp, made from agave fibres) is a very profitable article. Another vegetable product, now exported to the United States, is *chicle*, the inspissated sap of the *Sapota achras*. It is used for chewing, and lately it has been applied in the United States to some of the same purposes as indiarubber. It makes a good waterproof varnish. The town of Campeche is no longer the emporium for the commerce of Yucatan, Tabasco, and Chiapas, but depends almost entirely on the export of the dyewood named after it. Carmen, situated on the island of that name, at the mouth of the Laguna de Terminos, is a place of more importance. It commands the trade of the rivers falling into the Lagoon, which drain some of the richest country in Yucatan, and exports large quantities of *chicle*, logwood, mahogany, cedar, etc.

Population of British Guiana.—The total number of people living in the Colony on April 5, 1891, was 278,328. There are besides about 10,000 natives scattered over the interior. The increase since 1881 was 26,142, or 10·36 per cent., the natives being omitted in this calculation. This increase was higher than during the decade 1851-61, but lower than in 1861-71 and 1871-81. The number of inhabitants in Georgetown is 53,176, or 6001 more than in 1881, and in New Amsterdam 8903.—*Results of the Decennial Census of the Population of British Guiana.*

The Andes of Ecuador.—Dr. Theodor Wolf, who has lived for twenty years in this Republic, read a paper before the Gesellschaft für Erdkunde zu Berlin in December last (*Verhandl.* Bd. xviii. Nos. 9 and 10). The area claimed by Ecuador is about 302,000 square miles, but Peru claims all the tributaries of the Amazons as far as they are navigable, that is, to the foot of the eastern cordillera, and Colombia wishes to draw her boundary along the river Napo to the Amazons. Were the frontiers thus delimited, the area of the Republic would shrink to one-third of that above mentioned. Dr. Wolf found that the mountain region of Ecuador lies considerably more to the east than the position given by Humboldt and in the present maps. As far as the coast is concerned, the positions have been rectified on the British Admiralty charts, but a similar error is observable in Humboldt's determination of inland points. To give one example, Dr. Wolf

found that the difference of longitude between Alausi and Guayaquil is 1° 11′ 30″, or 13′ 58″ greater than Humboldt's calculation, and if the latter place be moved, in accordance with later observations, 6′ 37″ to the east, Alausi must undergo a total displacement of more than 19½ minutes in the same direction. Where the Amazons, descending from the highlands of Peru, bends round to the east between 5° and 6° S. latitude, its course is only about 32 geographical miles distant from the Bay of Sechura in the Pacific Ocean. A lofty but rather narrow chain runs between, and separates regions of the most diverse character. On the east lies the sandy desert of Sechura; on the west opens out the basin of the Amazons, one of the most abundantly watered countries of the World and surpassing all others in tropical splendour and exuberance. Here only 6500 feet high, the chain rises as it advances northwards into Ecuador, until at Huancabamba it attains an elevation of 12,000 to 13,000 feet, which it retains beyond Loja. At the same time its western slope becomes less arid, sending out first the Rio de Piura, which, however, loses itself in the sand near Sechura, and then the Achira, which reaches the ocean above Payta. Between the rivers short spurs run out out eastwards and westwards, but no great bifurcation occurs till the parallel of Loja is almost reached. This town lies, at an elevation of 7200 feet, in a basin enclosed by two branches of the cordillera, of which the eastern has an average height of 13,000, and the western of 10,000, feet. Whereas the other enclosed valleys of Ecuador are bounded by the eastern or main cordillera, a western cordillera which here springs into existence, and transverse ridges, that of Loja lies wholly in the main cordillera. This great chain is composed wholly of archaic rocks in the southern part of Ecuador, and in the north its core consists of the same materials, whereas the western cordillera is built up of later formations —diorite, diabase, porphyry, etc., and steeply tilted sedimentary rocks of the Mesozoic Period, probably belonging to the chalk formation. The enclosed basins referred to above commence at about the parallel of Loja, and succeed one another northwards to Colombia. They are drained by rivers which break through the cordilleras, either westwards towards the Pacific, or eastwards to the Amazons. Dr. Wolf describes the peculiarities of each, and has clearly shown the configuration of the country in a map accompanying his article. Traces of volcanic action make their appearance on the frontier of the province of Loja, in the upper valley of the Rio Jubones, and on the huge mass of Azuay, lying between the cordilleras, volcanic rocks have attained a considerable extension. Up to this point, however, the main cordilleras have been spared. On the eastern cordillera this action begins at the volcano of Sangay, the most active volcano in the world, according to Dr. Wolf, and at Chimborazo it takes possession also of the eastern cordillera. Northwards of Sangay rises the Altar, or Collanes, to a height of 17,700 feet, and is succeeded by Tunguragua, 16,680 feet high. Opposite the latter, on the western cordillera, stands Chimborazo, 20,700 feet, while between them, connected with the latter by the saddle of Sanancajas, is the extinct volcano of Igualata, 14,600 feet in height. The basin of Quito is also surrounded by lofty volcanoes, among which is the noted Cotopaxi, the second highest mountain in the country, being 19,150 feet in height.

The outer slopes of the Andes are clothed with very dense forests almost up to the limit to which trees can grow, 10,000 feet. This zone is almost uninhabited, and the few unfortunate settlers look like walking skeletons, being worn out by fever and dysentery. At about 6500 feet the air becomes cooler, and the forest partly loses its tropical character. Here blossoms are most abundant: ferns, aroids, orchids and other epiphytic plants make the woods bright and beautiful. At 10,000 feet the *Paramo* is reached, a grass-covered region where the air is quite cool.

From the crest of the ridge, in crossing, for instance, over Chimborazo to Riobamba, the eye roves with astonishment over quite a different landscape. 1600 feet below is spread out a basin, 9 to 14 miles broad and 18 to 22 miles long, where villages, with houses of stone or adobe, are scattered among fields of wheat, barley, potatoes and lucerne, divided by hedges of aloe and cactus. But though in some parts a mild climate, abundance of water, and a fruitful soil yield rich harvests, and the farms are prettily situated among groves of myrtles and oranges, the general impression produced by a journey through the upland valleys is one of aridness, desolation, and barrenness. Two-thirds of the land are uncultivated, owing either to the quality of the soil or absence of water for irrigation. The indolence of the inhabitants increases the poverty of the land. They use the roughest and most inefficient implements, and never manure their fields. It is only by the help of Indian slaves that they manage to exist at all. A large part of the upland regions consists of *paramos*, where half-wild cattle are fed on the dry grass. The climate here is cold and misty and the flora poor. Animal life is also scarce: stags, bears, foxes, and tapirs are but rarely met with, and of birds there are only a few hawks and one or two smaller forms.

MISCELLANEOUS.

We have much pleasure in announcing that **Dr. H. R. Mill** has been appointed to the post of Librarian of the Royal Geographical Society.

The **Mineral Products of Australasia** in 1890 reached the value of £12,283,391, of which New South Wales contributed £5,003,903, representing chiefly silver, silver-lead, and coal.—*The Colonies and India*, March 5th.

The next **International Geographical Congress** will be held in London in 1895. An organising committee, with Major Leonard Darwin, R.E., as chairman, and Mr. Scott Keltie, as secretary, has been appointed by the Royal Geographical Society to make preliminary arrangements.

The Colonies and India, Feb. 27th, announces that **Lieut. von Höhnel** is preparing to make another expedition in Africa. He will ascend the Tana to Mount Kenia and, after making a thorough survey of the neighbourhood, will proceed to Lake Rudolf for the purpose of making a more complete examination of that region.

The **Vorskla**, which fifteen years ago watered one of the most fertile districts of Little Russia, is now choked up with sand. The forests which formerly clothed its banks have been cleared away by timber-merchants, and now all that is left of the river is a few pools in the deepest parts.—*Revue Française et Exploration*, Jan. 15th.

The *Journal of the Anthropological Institute*, vol. xxi. No. 6, gives an interesting account of the **Similkameen Indians** of British Columbia by Mrs. S. S. Allison. Their complexion approaches more closely to the yellow paleness of the Chinese than to the copper colour of the Red Indian, and their feet and hands are small like those of the Chinese.

In *Petermann's Mitt.*, Bd. 38, No. 1, is published an interesting map by Dr. Ed. Hahn showing the different forms of **agriculture**, etc., pursued in the various quarters of the Globe. Six colours are employed to indicate the territories of fishermen and hunters, the land (chiefly in the Tropics) cultivated with the hoe, plantations, field-cultivation, cattle-grazing, and the horticulture of the Chinese and Japanese.

NEW BOOKS.

NOTE ON *The Lake-Dwellings of Europe*.

Dr. Munro writes us to say that in our review of his *Lake-Dwellings of Europe* we have overlooked his meaning in several respects. At p. 552 he remarks: "In regarding an opinion as to the original founders of the lake-dwellings in Central Europe, I would say that they were part of the first neolithic immigrants who entered the country by the regions surrounding the Black Sea and the shore of the Mediterranean, and spread westwards along the Danube," etc. This statement led us to infer that in Dr. Munro's opinion the neolithic Europeans came from Asia. His assertion, however, is not general, he says, but strictly limited to the lake-dwellers. He also holds that the Swiss lake-dwellers were substantially the same race, and lived continuously in their pile-villages from their first construction in the early neolithic age down to the close of the bronze age, when they were finally overthrown by an incoming race who used iron weapons and implements. We quite understood him to say so, and pointed out that he rejected the notion of those writers who have maintained that the development from the stone age to that of the iron age had been carried on by the same race. The author's negation of this theory, however, only applies to the lake-dwellers—the continuity from the stone age to the iron age may hold good, he thinks, for other localities. In our review we state—"Dr. Munro's belief is that there are no remains of lake-dwellings east of a line from Trieste to Königsberg." We gathered as much from what he says at pp. 495, 496, and p. vii., but it seems that we failed to discover what his opinion actually is. He did not mean to infer that no lake-dwellings may not yet be found east of the line referred to; but simply that this line marks the eastern limits of the region visited by him. ED.

The Realm of Nature—An Outline of Physiography. By HUGH ROBERT MILL, D.Sc., Edin., F.R.S.E. London: John Murray, 1892. *Price* 5*s*.

Our pleasure in welcoming this admirable manual is not a little enhanced by the descriptive title the publisher has found for it. Even the inquiring section of the public seems slow to realise what is included under the term Physiography. But with its excellent title, this book has every chance of securing the attention of the student of Nature. There is much earth-lore that ought to be matter of common knowledge—that is the essential basis at once of the conversation of the street and of the study in any of the special departments of Natural Science. It is to give some account of this that Dr. Mill has addressed himself; and he has done so in a work lucid, well written, and fully illustrated, a work that may be much, if not all things, to all men. It is a successful attempt to indicate the co-ordination of the sciences, and to depict in their true close relations the several aspects of Nature, which have suffered much by being too often regarded as if entirely independent. It is by no means the mere collection of science primers which a short account of its contents might make it appear. Just as the numerous maps, by their colouring, make the salient features of configuration and climate plain to the tyro, and, by their careful and accurate presentation of numerical data, afford convenient quarries for the exact student, so the work throughout presents, in a readily accessible form and in an intelligible style, expositions of the important methods of scientific research, and of the results that they have yielded; these being systematically illustrated by detailed discussion of typical cases, while at the end of each chapter is given a list of references to works on special branches of the

subject and to the original memoirs, in cases where the facts or theories are not yet fully accepted.

The early chapters on the method of studying Nature, the scope of Physiography, Matter and Energy, are notable for the judicious selection of material and for clearness of aim and statement. The next three chapters present an epitome of the facts of Astronomy, with emphasis laid upon those points which throw light upon the past history of the earth, and upon those which have an important influence on its present economy. The Atmosphere, Climate, and Weather forecasts are then discussed with acceptable fulness and numerous important illustrations. Was not, however, the theory of the circulation of the atmosphere, which is here ascribed to the American, Professor Ferrel, first propounded by Professor James Thomson? The following chapter, that on the Hydrosphere, is particularly successful; recent researches on salinity, on estuaries, and on the circulation of water by wind are succinctly described, and do much to interest the reader in modern oceanography. The contour and character of the bed of the ocean, and of the continental area, are treated in a manner that has become possible only within the last few years. The contour-coloured maps and the illustrative sections embody the results arrived at by Murray, Mill, and Buchanan, as recently published in this Magazine and elsewhere. Here, too, we have, for the first time in a general manual, a clear statement of Murray's Coral Island Theory. Of the chapters on the crust of the earth, the action of water on the land, the record of the rocks, life and living creatures, and man in nature, it need only be said that they present the geological and biological aspects of geography in such a way as to maintain the interest of the reader at the standard secured by the earlier portions of the book.

A tribute of praise is due to Mr. J. G. Bartholomew, the compiler of the maps which do so much to elucidate the various sections of the manual. These are based upon the most reliable and recent authorities, and their execution is as satisfactory as their conception.

All in all, this is a book which we can cordially recommend to general readers and to students of science.

Galloway in Ancient and Modern Times. By P. H. M'Kerlie. Edinburgh: William Blackwood and Sons, 1891. *Price* 7*s.* 6*d.*

This work is a contribution of value to the history of Galloway, and, on several subjects, of the country generally, written by an author who has already shown his capacity for the task by his *Lands and their Owners in Galloway* and other writings. The style, certainly, is bald and wanting in literary form, and the order is broken by numerous digressions; but the matter more than redeems these defects. It exhibits a refreshing independence of view in the treatment of every topic, a well-founded contempt for traditional opinions, and a fearlessness of statement in regard to most subjects. These give special interest to the book, and constitute it an important addition to the truer history of our land which modern research is gradually establishing. From his knowledge of the languages necessary, especially those in early use in the country, and of northern antiquities, including old manuscripts, and from his patience in examining original sources, Mr. M'Kerlie was well equipped for the work he undertook. This had been already shown by his personal investigations in various fields, notably in expiscating the real story of Wallace's capture, as acknowledged by Dr. Rogers and here re-stated; and in this book he has also done similar service in other matters discussed. Among these may be mentioned his proof of the special part played by the Norsemen in early Galwegian story, on which mistaken notions have hitherto been too pre-

valent, even among writers on its local history; his correction of common errors regarding the early races that peopled the country; his defence of Blind Harry; his straight speech regarding the character and deeds of the belauded Normans under "the Conqueror," and of the Bruces and Stewarts; and much more of interest and importance regarding which straight speech is too rare, but for the sake of truth increasingly necessary. Many of the points discussed are of course polemical and will rouse dissent, but the author is well able to defend himself. His style of treating the subject will draw fresh attention to topics too often deemed finally settled. We hope the book will stir the traditional waters to some purpose, and help to heal not a few historical disorders.

The work consists, mainly, of a history of the region, secular and ecclesiastical, followed by a short and effective summary of the characteristics, antiquities, place-names, and productions of Galloway. It would be vastly improved by the addition of a full index to the very numerous matters handled and scattered up and down the varied and interesting volume; and we hope that this will be added in subsequent editions, which it deserves to secure. We cordially recommend the book to all students of early Scottish as well as local history, as one certain to reward careful reading, while equally sure to evoke discussion.

The Trade Policy of Imperial Federation from an Economic Point of View. By Maurice H. Hervey, Principal of Illawarra College, New South Wales. London: Swan Sonnenschein and Co., 1892. Pp. x. + 182. *Price* 2*s.* 6*d.*

Principal Hervey has produced a work which ought to attract attention at the present time, when Britannic or Imperial Confederation is so much discussed. Unfortunately it contains many passages betraying an imperfect acquaintance with the principles of Political Economy and the history of the science, which will not conduce to gain for it an attentive hearing. He mentions no writer later than Stuart Mill, and of his and Adam Smith's writings he says that they "contain a ton of theory to an ounce of fact," the words "theory" and "fact" being here used in accordance with definitions of his own: otherwise the inductive logician would be dumbfoundered at the statement that Newton "converted Copernicus' theory into fact." However, in the first or introductory part of the book the most striking disadvantages of Protection are fairly well expounded, considering the space devoted to the subject. But the chief interest naturally lies in the second part, where the trade of Great Britain and her colonies is discussed. The author bases his scheme on the view, generally held by economists, that it may in some cases be desirable that a nation should put up with the loss entailed by a protective policy for the sake of promoting national unity, rendering itself independent of foreign supplies in time of war, etc. He, therefore, proposes that a trade alliance should be established between all the British Possessions, with a moderate protective tariff, so that production within the Empire would be stimulated, and Great Britain be supplied from her own Colonies instead of from protective countries. That this is an end devoutly to be wished few, probably, will deny: but Principal Hervey's figures will give rise to much debate. He estimates the decrease of the trade of Great Britain on the formation of the alliance at over 253 millions sterling—a loss which few will regard with as much equanimity as he apparently does. However, the tariff must, of course, be raised by degrees, and countries often pay part at least of their own protective dues, so that the trade with countries with which it would be impossible to form treaties might not diminish to the extent he anticipates. Again, we fear that little credence will be given to the author's forecast that twelve months after commercial union the trade of Great Britain would have

risen again to 714 millions (about 65 millions less than at present), and the total trade of the Empire to 1682 millions. This question cannot be settled till after long investigation and discussion ; but at any rate, Principal Hervey deserves the thanks of the advocates of Britannic Confederation for his support. After a trade union has been established, a closer political union may follow. This Principal Hervey assumes will take the form of "representation of the states in a Central Imperial Parliament," which, he affirms, "merely needs a Royal Warrant to spring into existence." For our part, though not disposed to accept Professor Freeman's view that political union of a closer kind is impossible, we cannot shut our eyes to the enormous difficulties that stand in the way of its accomplishment.

Two Happy Years in Ceylon. By C. F. Gordon Cumming. Illustrated, in 2 vols. Edinburgh and London : W. Blackwood and Sons, 1892. *Price* 30*s.*

Miss Gordon Cumming deserves all credit for her courage in undertaking such an arduous journey through Ceylon, and for the admirable way in which she has recorded her experiences. With the exception of Sir Emerson Tennant's *Ceylon*, now rather out of date, we have no work on that island at all approaching this in completeness of detail, or in accurate information. The authoress had unusual opportunities of visiting some of the less frequented parts of the interior, and has noted many things of great interest, seen under exceptionally favourable circumstances. In the first chapter she remarks upon the rapid development of the tea industry, the increase in the value of the pearl fisheries, the growth of Colombo since it became the point of call for steamers, and the consequent desertion of the beautiful but dangerous Point de Galle. Many of the ruined cities and *dagobas* were visited by the authoress, and the gigantic tanks which are now being restored, along with the ancient irrigation system enabling the cultivators to utilise the rainfall, which in many parts of the island is very precarious. The "Giant's Canal," 53 miles in length and 40 feet wide, which carried the water from the great reservoir of Kala-wewa, has been restored, and thousands of acres of rice fields now take the place of dense forest and impenetrable jungle. In the Batticaloa district the repair of the great tanks has restored prosperity to all the surrounding country, and these mighty reservoirs are again put to their proper use after lying in ruins for centuries. The various vegetable products and their economic uses are fully described, and the flowers and ornamental shrubs are not forgotten by such an enthusiastic lover of nature. A number of excellent illustrations from original sketches by the authoress serve to embellish a book which is altogether deserving of the highest praise.

Travels in the Mogul Empire, 1656-1668. By François Bernier. Edited by Archibald Constable, M.As. Soc. Beng., F.S.A. Scot. Vol. I. of Constable's Oriental Miscellany. Westminster : Archibald Constable and Co., 1891. Pp. li + 498. *Price 6s. net.*

Messrs. Constable and Company have displayed good judgment in selecting Bernier's travels to be the first volume of their new Oriental Miscellany, and they have supplied a real want of students of Indian History and of Political Geography by giving the work of the distinguished French traveller in a convenient form, beautifully printed, and with admirable explanatory and illustrative notes. Bernier's work gives a description of the condition of India and its people and of the organisation and working of the Government at the time when the Mogul Empire attained its acme, which is of permanent value. He had qualifications for his task such as few of the early travellers in India possessed. He was an acute observer and a painstaking and thoughtful inquirer : he was a man of wide general culture and philosophic spirit, who had studied the comparative civilisation of many

lands, both Western and Eastern : he held a position at the court at Delhi, which afforded the means and opportunity of obtaining good information ; and he was animated by a truly catholic spirit in his judgments on men and manners. His style has also the usual lucidity and grace of good French writers. The translation adopted is in the main that of Irving Brock, which was issued in 1826 and probably prepared to be included in the miscellany issued by the well-known ancestor of the present editor and publisher. But this, as a comparison shows, has been thoroughly revised and improved. In the text Mr. Constable has retained what he describes as the "admirably phonetic transliterations" of Oriental names contained in the first French editions. They are "admirably phonetic" for a French reader, but can hardly be described as admirable in a translation for English readers and for "our fellow-subjects in India who have received an education in English," to whom the miscellany appeals. Unless the reader knows the value of the letters in French, and stops to think of it, not a few names will rather puzzle him. Even if a phonetic transliteration, such as English contemporaries of Bernier used, had not been followed, at least a few changes, where letters have a different value in English and French, might have been made with much benefit to the purely English scholar —such as the substitution of *sh* for *ch* and of *j* for the combinations of letters a Frenchman has to use. It must be admitted, however, that the point is not one of much importance, and by noticing it at this length one is apt to give a false impression. The volume has been admirably edited and illustrated. The numerous allusions in the text to individuals, places, productions of art and industry, etc., are well explained in brief but sufficient notes, which contain the results of careful research in contemporary historians, and of an intimate personal acquaintance with Indian life and industry at the present day. The editing has evidently been a labour of love, and is done with a completeness and a satisfaction to the reader that only such labour can yield. Almost the only Oriental word left without a note is "Agenas," on page 215, and that probably because Bernier's own explanation in the text was thought sufficient. Had it been printed (as suggested above) "Ajnas," an Indian reader, at least, would at once have recognised the ordinary word for payment in kind or in goods.

The Real Japan : Studies of Contemporary Japanese Manners, Morals, Administration, and Politics. By HENRY NORMAN. London : T. Fisher Unwin, 1892.

The weakest part of this book is its ambitious title. To call a collection of essays, able though they be, upon a few prominent aspects of Japanese modern life, by such a high-sounding name as *The Real Japan*, is distinctly misleading and not a little grotesque. Omit these first three words, however, and we get a fair description of the character of the book. It discusses with general accuracy and in an interesting manner such matters as journalism, police, prisons, justice, education, the army and navy, certain aspects of high art, ancient and modern, the professional singing girl, and the very unique system of licensed prostitution. We cannot say that the author has at all penetrated through the superficial guise of Japanese life, official or social. For example, the chapter on "Japanese Women" is very unsatisfactory—as such a chapter written by a man necessarily must be. Again, most of the features emphasised are so treated either because of their novelty to us of Western habits of thought, or because they illustrate the "imitative" faculty of the race. The picture as a whole is therefore distinctly one-sided. On his limited canvas, however, Mr. Norman has succeeded in giving a very vivid and (in a sense) true impression of certain phases of Japanese life. We have noticed comparatively few mistakes, and these generally insignificant. A very glaring error, however, is the statement that the Imperial University is "German

in its methods," and that "after Japanese, German is the language talked there." Mr. Norman surely must have wearied of his visit after he had investigated the Medical College and the Hospital, for in this department alone is the German language used. In *all* the others—Law, Literature, Engineering, Science—the necessary European language is English; and in English even the German Professors in these colleges have to lecture. Moreover, the methods and organisation are curiously eclectic, depending largely upon where the professors themselves have been trained. Japanese methods, however, predominate in details of organisation. Again, it may be questioned whether the police system is so purely French as Mr. Norman's remarks might lead us to believe. Under the Tokugawa rule Tokyo (then Yedo) was patrolled by an efficient body of *gendarmes* and watchmen; and no doubt much of the former organisation still survives. In one chapter, "A Rush to a Volcano," the author turns his attention from man to geology; and gives a very readable account of a visit paid, a few days after the event, to Ban-dai-san, the volcano which suddenly exploded in 1888 and devastated a large tract of country. The illustrations are on the whole good; although we think the omission of a few, especially in chapter xi., might have added to the attractiveness of the book and in no way diminished its value.

Japanese Girls and Women. By ALICE MABEL BACON. London: Gay and Bird, 1891. Pp. 333. *Price* 5*s.*

Of the many books that have been written on Japan this strikes us as one of the very best. Coming at a time when extravagant pictures of certain classes of Japanese womankind have well-nigh exhausted our patience, it is pleasant to read and re-read, and cannot fail to correct not a few false notions that have too wide currency. The authoress, who had peculiar facilities for gathering the material so well utilised, writes in a simple direct manner that proclaims on every page the honest purpose of the book. It is at once a picture and a study of the life, customs, training, and sentiments of Japanese women of high and low degree. But it is more: for in the elucidation of these feminine characteristics it is necessary to refer to many of the more general characteristics of the race, and this is done throughout with a sure hand. We doubt if any writer has with such clearness differentiated the two great sections of the Japanese nation—those that claim *Samurai* descent and those that do not. The old soldier class, whose descendants still rule, had an altogether different ethical code from those who were not privileged to wear the sword. The latter, consisting of farmers, artisans, tradesmen, have probably risen gradually through the centuries from a virtual if not nominal condition of serfdom: and on them even to the end fell the duty of supporting the barons and fighting retainers. The women of the *Samurai* led a life of comparative seclusion; and the old etiquette still largely survives, though the modern spirit is gradually introducing greater individual freedom. At present only a lady could get on such terms of intimacy with the Japanese ladies as would enable a true picture of their life and manners to be given. Miss Bacon's book therefore fills a distinct void: for Miss Bird's *Unbeaten Tracks* is the journal of a traveller, while the *Social Departure* is largely a work of fiction. Miss Bacon, moreover, discusses, with an ease and accuracy that display a good power of observation and a well-balanced judgment, all the educational and social aspects of woman's life in Japan. She emphasises very strongly the great philosophic principle of trying to get at the point of view of the people themselves before judging as to their motives in regard to a particular line of conduct. The book, in short, has a real ethnological value, disclosing the moral springs of conduct in a people whose sole merit so far in the eyes of the Western world is that they are artistic and polite.

Coomassie and Magdala. The Story of Two British Campaigns in Africa. By Henry M. Stanley. New Edition. Pp. x + 402. *Price* 3*s.* 6*d.*

The Great Lone Land: A Narrative of Travel and Adventure in the North-West of America. By Colonel W. F. Butler, C.B., F.R.G.S. Fourteenth Edition. Pp. x + 386. *Price* 3*s.* 6*d.* London: Sampson Low, Marston, & Company, Limited, 1891.

Unquestionably these new editions of two standard works of travel and adventure in the cheap and handy form here presented will be welcomed by many. They are, considering the price, remarkably well got up, and furnished with a good number of illustrations and some useful maps. Differing as widely in subject and treatment as in the quarters of the globe in which the scenes are placed, they have in common the merit of clear and vigorous narration, and of recording instances, well-nigh innumerable, of British pluck, resource, and perseverance. They ought to make acceptable presents for boys, who will follow with interest the many dangers and adventures recorded, and to older readers the amount of information they contain will certainly be useful and entertaining.

Untrodden Jamaica. By Herbert J. Thomas. Kingston: Aston W. Gardner and Co., 1890. Pp. 90.

A large part of Jamaica, including a considerable mountain area, still remains to all intents and purposes an unknown country, not only to visitors but to the inhabitants themselves. Mr. Thomas has thoroughly explored this district, and has much of interest to tell about its beautiful scenery, and the incidents of travel he met with. The little volume ought, at least, to do something to open up a fine country well worthy of a visit from all those who admire the picturesque, and are not afraid of some hard work in the way of climbing and overcoming the usual difficulties to be met with in an almost uninhabited region. The illustrations are numerous but rough; the map is poor.

The New Jamaica. By Edgar Mayhew Bacon and Eugene Murray Aaron, Ph.D. New York: Walbridge and Co. Kingston: Aston W. Gardner and Co., 1890. Pp. xi + 243.

Evidently written as a guide to visitors to the Jamaica Exhibition, this little work contains more, and more varied, information than its purpose would lead one to expect; and although the authors have been compelled, in consideration of space, to curtail their chapters in some cases, and in others to leave such interesting topics as the folk-lore of the island entirely untouched, yet they have managed to produce an eminently readable geographical account of one of our oldest and most interesting colonies. The historical part of the volume is short but succinct, and only with the portion dealing with the administration of Governor Eyre can fault be found. Eyre was not immaculate, neither was his policy, though perhaps the best that could have been followed in the circumstances; but he was a single-hearted man, working, according to his light, with a strong desire to do his best for the land he had been called upon to rule. The chapter on the climate is valuable, and contains information likely to be new to many; and that on the trade of the island points its own moral clearly enough. The matter giving accounts of the present state and condition of the towns, and describing the scenery to be met with in many and various excursions over the mountains and through the rural parts of Jamaica, is well done; but we wish that a little more space and attention had been given to the geology of the districts. It is true that the reader is referred to Sawkins' work, but it is not always easily obtained, and

is, besides, becoming antiquated. The volume is nicely illustrated with views from photographs and sketches by the authors ; but each ought to have had a title, and to have been placed, at least, in proximity to the page where it is described. The map is too small for the number of names it contains. There is a good index.

The Statesman's Year-Book, 1892. Edited by J. Scott Keltie, Assistant-Secretary to the Royal Geographical Society. Pp. 1151. *Price* 10*s.* 6*d.*

We have nothing but praise to accord the editor of this important Year-book for the excellence and merit of its current issue. Wherever we have tested it, we have found it well up to date, except in one instance. Both in the map and text Italy is still credited with her former Protectorate over Abyssinia and Shoa, whereas we understood this to have been officially withdrawn, as it most certainly is repudiated. Italian journals speak of the colony of Eritrea as now being included within the small triangular strip of territory formed by Massawa, Keren, and Asmara, and of the equivocal Protectorate outside this small area as having been abandoned.

A new and commendable feature this year is the introduction of maps illustrating important political changes or problems. We find maps of the British Empire, Africa, and the Pamir highlands,—all excellent in their way, and likely to prove of service. The first two maps might, perhaps, be regarded as unnecessary. There is always a danger of the book trespassing beyond its proper limits. We are inclined to think that, in future issues, the *Statesman's Year-book* should only give maps, chiefly sectional, showing changes of political boundaries and territorial acquisitions, and, to a very limited extent, illustrating by original treatment any outstanding political problem of the day. Surely no one who requires to use this *Year-book* will be without an atlas of some sort?

The Northern Counties Red Book and Chronicle Almanac for 1892. Inverness : *Northern Chronicle* Office. Pp. 88. *Price* 3*d.*

The *Red Book* continues to hold its place for utility and accuracy as a gazetteer and directory for the northern counties of Scotland. Its chief fault appears to be that the county lists are not all equally full. This might very easily be remedied, and the additional matter thus added would well fill the place of some, at least, of the unpaged padding with which this issue is overloaded.

South American Railways. Argentina and Uruguay. By J. R. Carter, F.G.S. London : Fred. C. Mathieson & Sons, 1891. Pp. xii. + 204. *Price* 2*s. net.*

This little volume, now in its second edition, contains particulars, more or less full, regarding the progress, present state, and statistics of the railways in Argentina and Uruguay. In many cases the amount of matter collected is large and likely to be of service, but in others it is most meagre. But, when little has been gathered, or when there is little to tell, the page is left almost entirely blank, so that particulars and notes may be added as new facts are ascertained.

Britannic Confederation : A Series of Papers by Sir John Colomb, Professor Edward A. Freeman, George G. Chisholm, Professor Shield Nicholson, Maurice H. Hervey, and the Right Honourable Lord Thring. Edited, with an Introduction, by Arthur Silva White, Secretary and Editor, Royal Scottish Geographical Society. With a new map of the British Empire. London: George Philip and Son, 1892. Pp. 180. *Price* 3*s.* 6*d.*

The above series of papers is reprinted from our *Magazine*, and issued in book form by Messrs. Philip and Son. It is handsomely bound. The large map of the British Empire is accommodated in a pocket.

NEW MAPS.

EUROPE.

ISLAND, Geologische Karte eines Teiles des Innern ——. Nach eigenen Aufnahmen in den Jahren 1888 und 89 gezeichnet von Th. Thoroddsen. Massstab 1 : 600,000. *Petermann's Geogr. Mitteilungen*, 1892, *Tafel* 3. *Gotha: Justus Perthes.*

PELOPONNES, Topographische und Hypsometrische Karte des ——. Nach der *Carte de la Grèce, redigée et gravée au dépôt de la Guerre* (1 : 200,000), Paris, 1852, den Britischen Seekarten, sowie eigenen Aufnahmen und Höhenmessungen gezeichnet von Dr. Alfred Philippson. Massstab 1 : 300,000. 4 Blätter. 1891. *Price* 12 *M.* *Berlin: R. Friedländer und Sohn.*

Dr. Philippson visited the Peloponnesus, with the aid of the Berlin Geographical Society, in 1887-89, for the purpose of making geological and physical-geographical researches. He crossed the country in all directions, and the results of his travels are published in two handsome volumes, *Der Peloponnes, Versuch einer Landeskunde auf geologischer Grundlage.* The topographical and hypsometrical map accompanies the book. After the battle of Navarino French officers surveyed Greece, and a map was published forty years ago by the Dépôt de la Guerre, on the scale 1 : 200,000. As might naturally be expected from the state of the country at the time of survey, many errors slipped in. Dr. Philippson's new hypsometrical map of the Peloponnesus is based on this *Carte de la Grèce*, but owes much to his own careful surveys. The contours are drawn at intervals of 500 mètres from 100 mètres above sea-level upwards. Instead of the 100 mètres line, we should have preferred the 200 mètres contour. During his twelve months' stay Dr. Philippson measured with two aneroid barometers more than 800 heights in all parts of the Peloponnesus. The submarine contours are traced at the same intervals as those on the land, and are compiled from the British Admiralty charts. The map is the best of the Peloponnesus published, is admirably executed, and shows the mountain-features at a glance.

ASIA.

WESTLICHEN KLEINASIEN, Specialkarte vom ——. Nach seinen eigenen Reisen und nach anderen grösstenteils noch unveröffentlichten Routenaufnahmen bearbeitet von Heinrich Kiepert. 15 Blätter. Massstab 1 : 250,000. Lieferung 3. 1892. *Price* 30 *M.* *Berlin: Dietrich Reimer.*

The first and second parts of this map have already been noticed in this *Magazine.* The third part contains the sheets : Kiutahia (6), Afiun-Karahissar (9), Aidin (11), Isparta (12), Adalia (15), a general index-map, and a supplementary sheet on the same scale to show the Anatolian Railway to its terminus, Angora. All these sheets are of the same excellent quality as those published in the previous parts. The central portion of Aidin (11)—the ancient Caria—has been drawn from Professor Kiepert's own itineraries of 1879 and 1888, while the north-eastern part—the neighbourhood of the Baba-Dagh—has been compiled from the valuable surveys of Dr. Bukowsky in 1890 ; and the triangulations of the same traveller, which extended also over the northern region of Section XII. and the southern zone of Section IX., have enabled the author to fix with some accuracy all the main points in connection with the survey of the newly opened railway to Diner. Much of the topographical detail has been obtained from Professor Ramsay's careful observations. Owing to the accidental delay of a communication from Professor

Ramsay, the author has had to alter an important part of his map. The well-known ruins of Aigonai in ancient Phrygia had to be shifted six minutes to the east and two and a-half minutes to the south. This correction unfortunately affected four sections. A place, Tcheltikdjikiöi, drawn near the margin of Section VIII., is repeated on Section IX. in its right position, and must, therefore, be deleted from the former. Section XV. is, in general, a repetition of Professor Kiepert's map of Lycia, published seven years ago in Benndorff-Niemann's book. Of Professor Ramsay's numerous identifications of historical places the author has inserted on his map in ordinary type only those which were really ascertained by inscriptions, while those distinguished by thinner characters possess a certain degree of probability. For the transliteration of the names the system of the Paris Geographical Society has been adopted. A detailed explanation of the different itineraries used in the compilation of this map will be published separately by the author in collaboration with Professor E. Fabricius.

PERSIA, Afghanistan, and Beluchistan. Compiled under the supervision of Hon. G. Curzon, M.P., by W. G. Turner, F.R.G.S., 1891. Scale, 1 : 3,810,000, or 60 miles to 1 inch. *Proceedings of the Royal Geographical Society, February* 1892.

AFRICA.

AFRIKA, Spezial-Karte von ——, im Massstab 1 : 4,000,000 (10 Blatt), entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Doman, und Dr Richard Lüddecke. Lieferungen 1 und 2. 1892. *Price* 3 *M.* each.

Gotha: Justus Perthes.

The first edition of this excellent map of Africa was published on the occasion of the centenary of Perthes' Geographical Establishment, in 1885, and, in consequence of hurried publication, was somewhat marred by inferior technical execution. In the second edition, however, we noticed a marked improvement in drawing as well as in printing and colouring. The present (third) edition is in every respect a success. The partition of the African Continent amongst the European Powers has settled the political question for some time to come. Discoveries of great importance are no longer to be expected, but expeditions, sent into the interior to open up the country for commercial enterprise, are continually adding to our knowledge. After a year or two a map of Africa is out of date and a new edition becomes a necessity. Three maps of Africa on large scales by Lannoy de Bissy, H. Habenicht, and Dr. R. Lüddecke are the only maps which are kept constantly up to date. Lannoy de Bissy's well-known map, we regret to say, barely keeps pace with the rapid progress of African cartography, owing to the author's military duties. This new edition of Habenicht's large *Africa* will be heartily welcomed by every one interested in African affairs. Two parts, containing the sections Central Sahara (2), Egypt (3), Central Sudan (5), and Abyssinia (6), are issued. The corrections on the first two sections are slight, while those on the other two are very numerous. The Delta of the Niger, the German Protectorate of the Cameroons, as well as the central course of the Congo, the Aruwimi, the Mobangi-Welle-Makua, and the whole region traversed by the late Dr. Junker, have been completely redrawn. The environs of Massaua have been corrected from the Italian survey-maps, and the Lake Rudolf region is drawn from Lieutenant von Höhnel's excellent map. The country between Zeila and Ankober is drawn from Fritzsche's compilation, and the Somal coast from Obia to C. Guardafui has been altered from Brichetti-Robecchi's route-map *Obia-Allula*. An explanatory letter-press, containing the data used for the present edition, accompanies each section.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE YELLOWSTONE REGION AND ITS GEYSERS.

(*With Illustrations and Sketch-map.*)

By Henry M. Cadell, of Grange, B.Sc., F.R.S.E., Etc.

(*Read at Meetings of the Society, Edinburgh and Glasgow, March and April* 1892.)

The Yellowstone National Park is doubtless well known by name to the members of the Royal Scottish Geographical Society, but as many may have as little idea as I had, before visiting it last autumn, of the precise geographical and geological features of this delightful and wondrous region of the Far West, some account of it may not be without interest for them. The first authentic account of the region in which the Park is situated was published in 1871, in a report by Dr. F. V. Hayden, United States geologist, who gave a brief sketch of the explorations made by the survey under his charge. The results of the surveys made in 1871 and 1872, when published, attracted much attention, and in 1872, before settlers could come and take possession of the objects of beauty and the natural curiosities it contains, Congress stepped in, and, on the recommendation of Dr. Hayden, passed a bill withdrawing the region from settlement, occupancy, and sale, and setting it apart as a "National Park or pleasure ground for the benefit and enjoyment of the people." The altitude is generally too great and the climate too severe for stock-raising and agriculture, and the probability of finding much valuable ore in the region is small, so that economically there could be little, if any, national loss in this proceeding. On the other hand, the gain to the travelling public is inestimable. The region is free and open to all well-behaved visitors, who may wander about and explore its beauties and natural wonders without being annoyed by showmen,

and made to pay exorbitantly for each sight, as was done at Niagara before the respective Governments bought up the banks and turned them into national recreation grounds for the people on either side of the river. A comprehensive report on the geology, thermal springs, and topography of the Yellowstone Park was published in 1883 by F. V. Hayden, and subsequent more detailed investigations have been made by the United States Geological Survey, whose officers are still engaged in the examination of the region.

A park, according to our Eastern ideas, is apt to be associated more or less with the idea of flatness, or at least smoothness and culture, but in America the term is applied to any area set apart as a pleasure-ground, whether it be smooth or rugged, tame and grassy, or bristling with wild rocks and shaggy forests. The Yellowstone Park belongs to the latter category. It lies in the midst of the Rocky Mountains, in the north-west corner of the State of Wyoming, and is bounded on the north by the territory of Montana, and on the west partly by Montana and partly by the territory of Idaho. The area originally set apart by Congress covered about 3575 square miles, but last year an additional tract of nearly 2000 square miles was added, extending the reservation eight miles to the south, and about twenty-four miles to the east. This great reservation, which thus forms approximately a square about seventy-five miles in diameter, is, however, not intended only for the benefit and enjoyment of holiday-makers, scientists, and tourists. Situated as it is on the "Great Divide," its pine-clad mountains form the gathering ground for the head waters of large rivers flowing away to the Atlantic and Pacific Oceans, and its sequestered dells and forest recesses afford a secure retreat to the surviving wild animals of the country. The American Government has wisely recognised the necessity of preserving the forests for the sake of the rainfall and the rivers, and the Park plateau, situated as it is some 7000 feet above sea-level, is exceptionally suited to collect the watery clouds which, coming from the south-west, precipitate vast quantities of snow and rain on the cooled table-land and the mountains which surround it. The climate of the Park is cooler and moister than that of the surrounding country. Rain-storms are common in summer, and snow may fall at any time between September and May. The deep snows of winter are preserved by the forests throughout a great part of summer, and in some of the higher altitudes the drifts never completely disappear. The topographical structure of the region thus renders it a valuable reservoir for catching, storing, and distributing an exceptionally large water-supply, which is of great value to the arid tracts of country across which the effluent rivers flow.

Hunting is prohibited in the Park, and the fast disappearing race of the bison has here a secure sanctuary from the enemies that have almost exterminated it elsewhere. There is said to be a herd of 500 buffaloes (bisons), and among the other wild animals in the Park may be mentioned the moose, bighorn (mountain sheep), deer, pronghorn, bear, puma, wolf, fox (red, gray, and black), coyote, beaver, otter, mink, marten, sable, musk-rat, ermine, rabbit, badger, porcupine, hare, squirrel, chipmunk, wolverine, and skunk. Among birds, which are principally

migratory, are included the grouse, owl, hawk, eagle, vulture, duck, goose, brant, pelican, swan, crane, crow, raven, blue jay, and hangnest. Reptiles are rare, but the rattlesnake is found in parts of the Yellowstone Valley, below a height of 6000 feet.

Fishing is, however, permitted, and excellent sport may be obtained in the various lakes and rivers, which contain abundance of mountain trout, grayling, and other fish. The United States Fish Commission has introduced various new species, including the Lochleven trout, into several of the streams and lakes. The fishing in the Yellowstone and Heart Lakes has, however, been considerably depreciated by the appearance of a parasitic worm, which has injured many of the trout in these waters.

In order to preserve the amenity, forests, and wild animals of the reservation, as well as to secure the safety of visitors, a couple of troops of cavalry are quartered in the Park, but with such a large district to look after it is impossible to prevent depredations and the occasional outbreak of forest fires. When hunters can get £100 or £200 for a good buffalo head, the temptation to poaching is strong, and as the inhabitants in that remote part of the Wild West are not noted for their law-abiding instincts, it is not surprising that the police have often considerable difficulty in enforcing their regulations.

The Park has happily not yet been desecrated by railways, and travelling through it is effected by stage-coach or on horseback. Several large hotels have recently been built, with Government sanction, at suitable distances along the main roads, for the convenience of visitors who have not the means of camping out. Large numbers of the holiday-makers, however, bring their tents and camp equipage with them, and spend the long summer days among the fragrant forest glades and the gloriously tinted lakes that lie scattered like gems all over the landscape, or by the wondrous hot springs and roaring geysers, with their white plains of sinter and seething caldrons of the rarest hues.

I visited the region as a member of the great western excursion that left Washington at the close of the International Geological Congress, in the beginning of September 1891. Our party, which numbered about ninety, contained geologists from some fourteen different countries, and we were fortunate in having as leader Mr. Arnold Hague of the United States Geological Survey, who has devoted several years to the geological and topographical survey of the Park, and was thus well able to bring before us in order the most important scientific features of the region in the comparatively limited time at our disposal.

The Park plateau forms a well-defined region in marked contrast with the rest of the Rocky Mountains, and stands out boldly by itself, unique in topographical structure, and complete as a geological problem.[1] The central part of the Yellowstone Park is essentially a broad, elevated, volcanic plateau, between 7000 and 8500 feet above sea-level, surrounded on the south, east, north, and north-west by mountain ranges with summits rising from 2000 to 4000 feet above the general level of the

[1] See Mr. Arnold Hague's paper on the Geological History of the Yellowstone National Park. *Trans. Amer. Inst. of Mining Engineers.* Vol. xvi.

enclosed table-land. To the south of the Park the magnificent mountain masses of the Tetons, fully 14,000 feet in height, stand out prominently against the sky—the highest and grandest peaks of the northern Rocky Mountains. Further east, across the broad valley of the Upper Snake river, lies the Wind River range, famous from the earliest days of the Rocky Mountain trappers. The Absaroka range, which cannot be topographically separated from the Wind River, stretches along the entire eastern side of the Park, and offers for more than eighty miles a bold unbroken barrier to all western progress, forming as it does a pathless and rugged tract with peaks and crags from 10,000 to 11,000 feet in height. The Snowy Range shuts in the Park on the north, and is separated by the valley of the Yellowstone river from the imposing peaks of the Gallatin range, which forms its north-western boundary.

In the sides of this rugged amphitheatre there are three main gaps, through which the rivers of the Park find their way out of the plateau. The chief of these is the Yellowstone, which, issuing from the Yellowstone lake—a noble sheet of water in the centre of the Park—flows northwards through its magnificent cañon, and, picking up tributaries on its way, leaves the plateau near Cinnabar, a small village in Montana just beyond the northern boundary of the reservation. At this point the Yellowstone is increased by the Gardiner river, and flows northward to Livingston, on the Northern Pacific railroad, where it bends to the east and north and crosses the prairies to join the Missouri in North Dakota.

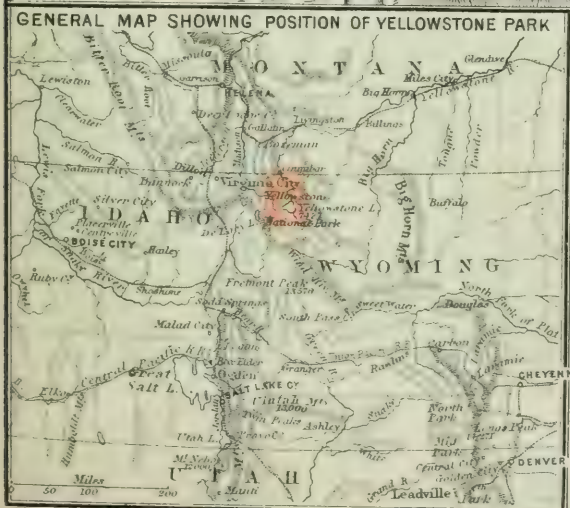
The second outlet for the drainage of the plateau is on the west, where the Madison, with its two main branches, the Gibbon and Firehole rivers, which carry off the warm waters from the principal geyser basins, flows outwards past the southern end of the Gallatin range and thence, trending northwards, joins the head-waters of the Missouri in the northern part of Montana. The greater part of the Park is thus drained by rivers which ultimately find their way into the Gulf of Mexico, but the south-western corner of the region lies within the Pacific slope, and the great continental divide meanders between these streams and the sources of the Columbia river on the west. The Snake river, or Lewis Fork of the Columbia, rises in the Shoshone lake, a sheet of water about six miles in length, nestling among pine-clad mountains, and situated some 7700 feet above the sea. It runs southwards through the third gap in the plateau amphitheatre, between the Tetons and the Wind River range, and, trending southwards and westwards, crosses the wilds of Idaho and the great plains of the Columbia ere it finally pours its mighty flood into the Pacific Ocean.

The principal access to the Park is from the north, along the valley of the Yellowstone and Gardiner rivers. Leaving the main line of the Northern Pacific railroad at Livingston, a branch railway conveys the visitor to Cinnabar, whence the rest of the journey is accomplished by coach or on horseback. From the railway terminus the road winds upwards for seven miles along the rugged gorge of the Gardiner river, the first halt being made at the Mammoth Hot Springs, where the wonders of the region begin to unfold themselves.

GEOLOGICAL SKETCH-MAP OF THE YELLOWSTONE NATIONAL PARK

After HAYDEN and BERGHAUS,

Illustrating Mr. H. M. Cadell's Paper.



Note to Colouring

- QUATERNARY.
- TERTIARY.
- MESOZOIC.
- Basalt.
- Rhyolite.
- Trachyte.
- Geyser Deposits.
- Outline of Former Lake, (Lake Hayden)

Edinburgh Geographical Institute

J. & C. Bartholomew F.R.G.S.

The Mammoth Hot Springs and their deposits of white and brilliantly coloured calcareous sinter, which, seen from below, look like the front of a melting glacier or a vast petrified cascade leaping out from the midst of a forest-clad mountain side, present a profoundly interesting and impressive spectacle. Among the many interesting natural phenomena and features of the Yellowstone region the hot springs and geysers hold the first place. They tell of the near proximity of the internal fires, and, in a country where active volcanoes are unknown and the ancient extinct craters have long been crumbling into ruins, they prove that, although ages have elapsed since the last of the lavas were poured forth, the old heat is not yet quite gone, and the last dying embers are still smouldering in the depths below. The famous Pink Terraces of New Zealand have been obliterated by volcanic eruptions, and there are now few, if any, other places where the formation of such deposits can be so well studied as in the Yellowstone Park.

On examining the Mammoth Hot Springs and their deposits more minutely, it is at once clear that the heat is diminishing steadily. One of the most striking objects is an obelisk-like stack of white sinter, which resembles a pile of old hats, and rises to a height of 43 feet above the flat hot-spring deposits that surround it. Liberty Cap—for such is its name—is the mouth of an old geyser, which has gradually built up a columnar rim of sinter around its orifice, as some of the geysers in the park are still doing. It has, however, long ago died out, and remains only as a monument of former greatness and power. In this locality there are no active geysers now, and all the interest centres in the numerous thermal springs and their deposits. The hot springs are, as might be expected, much more numerous than the geysers of the Park. There are only about a hundred of the latter, while the number of hot springs and boiling mud or paint pots, exclusive of steam vents, fumaroles, and solfataras, exceeds 3600.

Most of the deposits from the thermal waters of the Park are siliceous, but those of the Mammoth Hot Springs are entirely made up of travertine or carbonate of lime. This interesting circumstance is explained by the geological character of the district and the nature of the underlying rock. The Park plateau is built up of a thick series of volcanic rocks, which were poured out as lavas of various kinds during the Tertiary period. The earliest eruptions took place about the beginning of that era, when huge volumes of andesitic lava were poured over the region. These were followed by vast outbursts of rhyolite or quartz porphyry, which forms the central part of the Park plateau, and the last dying efforts of the volcanoes of the Yellowstone were marked by a comparatively insignificant series of basaltic eruptions which were prolonged into the Quaternary and recent periods. A geological examination of the ground at the Mammoth Hot Springs shows that the underlying rocks consist chiefly of Jurassic or Cretaceous limestones, which have supplied the calcareous ingredients of the water. In the other parts of the region the heated waters have risen through deep masses of highly acid or siliceous lava, the gradual decomposition and solution of which has provided the silica so abundant in the geyser basins.

The travertine deposits of the Mammoth Hot Springs cover an area of about two square miles, and occupy an ancient ravine on the west side of the Gardiner river. The upper limit of the formation, where the terraces begin, is about 1400 feet above the river and 7100 feet above the sea, and the travertine extends from this level down to the river in a continuous sheet of unequal breadth and thickness.

On climbing the slope from Liberty Cap to the steaming pools at the summit, eight tolerably well-defined terraces are crossed. The largest of these—the Hotel Terrace—has an area of 83 acres, and each terrace or bench has a more or less level surface, bounded by a steep and richly ornamented face which separates it from the terrace below. At some places the terraces exhibit exquisitely moulded clusters of cup-like forms with overhanging edges, from which thick fringes of snow-white stalactites droop in rich profusion. Some of the more perfect of these have a close resemblance to ornate pulpits—hence the name of Pulpit Terrace given to that part of the formation where these forms are most prominent.

Nearly all the hot springs issue from basins in the highest terraces. There are in all seventy-five thermal springs, with temperatures varying from 80° to 165° Fahr., and in many of these there is, in addition to mineral matter, a small quantity of sulphuretted hydrogen in solution, which gives the water its characteristic taste and odour. The hot water boils up into basins, the edges of which become encrusted with the lime which is precipitated as the solution cools, and, as the cooling is most rapid round the rim, the basins become gradually built up and moulded into their peculiar scalloped configuration. As seen from above these pools have the most exquisite and wonderful hues. The water comes boiling to the surface all glistening with silvery bubbles, or wells up quietly from the crystal depths of funnel-shaped orifices where it assumes the purest and most ethereal cerulean and emerald tints, and ere it reaches the edge of the basin it is wimpling quietly over a delicately frosted surface of calcareous sinter, here and there glistening in snowy whiteness, but oftener displaying a brilliant array of rich yellow, green, orange, red, and brown shades of colour, which sweep in long streamers over the rim and streak the front of the terraces for many yards below.

The brilliant shades of red, yellow, orange, and green which impart so much beauty and effect to the hot-spring deposits are found to be nearly always due to the presence of certain species of coloured algæ that live in waters of high temperature. The origin and nature of these deposits have been made a subject of careful study by Mr. W. H. Weed, who has given an interesting account of his researches in the *Ninth Annual Report of the U. S. Geological Survey*, 1887-88, p. 619. These investigations have shown that not only is the colouring due to algous vegetation, but that both the siliceous and calcareous sinter beds have themselves been in great part built up through the instrumentality of these humble representatives of the vegetable kingdom. Algæ have long been known to live in thermal waters at temperatures sometimes only 12° Fahr. below boiling point, but few observers have hitherto noted the geological work done by these lowly plants in the production of hot-spring deposits. We were fortunate in having Mr. Weed as our guide to the principal forma-

PULPIT TERRACE, MAMMOTH HOT SPRINGS.

tions of travertine and geyserite or siliceous sinter, and our attention was thus drawn to a most interesting geological phenomenon which might otherwise have quite escaped our notice.

Algæ are abundant in all the springs and wherever the hot waters flow, but the character and colour of the growths vary with the temperature of the water and with the situation in which they are found. If the temperature exceeds 150° Fahr. a white thread-like alga is the only species present, and is generally coated with sulphur; but where the water has cooled below this point a pale greenish-yellow variety is found, which in cooler water often entirely replaces the white species. As the water flows away and gradually loses its heat, this green alga by degrees gives place to a red or orange species, which mingles with it at first, but subsequently entirely replaces it, while in tepid streams, too cool to support any of these forms, an olive-brown species, forms a soft velvety covering over the surface of the travertine. In several of the basins, owing to differences in depth and temperature, an interblending takes place of the various tints of yellow, red, salmon, orange, and brown.

The presence of plant or animal life is not absolutely essential to the formation of great limestone deposits, but it is interesting to note that, as the little coral polyps build up great reefs by abstracting the lime from the sea, so here little seaweed-like plants have built up great banks of travertine or geyserite by abstracting lime or silica from the heated spring-waters on the land. The thermal waters that boil up from below hold much more lime in solution while they are under high pressure and mixed with carbonic acid gas, than they can retain after spreading out on the surface, losing the gas, and cooling under diminished pressure. The excess of lime is therefore deposited in considerable quantities, at first, without the aid of vegetation, and here, as at Carlsbad and elsewhere, there are places where objects such as baskets, leaves, and twigs become rapidly encrusted with lime when placed for a time at the edges of the springs. The great mass of the travertine of the Terraces, however, does not seem to have been produced in this way, but to have been built up by the little filaments of algous vegetation, which have the power of separating out the calcareous matter in solution, just as some of our own mosses build up considerable masses of spongy tufa round the mouths of springs in which the water is more or less calcareous.

Before leaving the Mammoth Hot Springs one other most interesting point may be noted. The depth of the limestone deposits bespeaks their great age, and the fact that, at places where the outlets have changed and the surface has become dry, old trees are growing over them, proves that the springs have been flowing steadily for centuries at least. At the top of Terrace Mountain, an outlying ridge of the rhyolite plateau, just west of the Mammoth Hot Springs, the oldest of the travertine beds are to be seen. On the surface of these beds there are many perched blocks, or glacial erratics, some of which have travelled from the summit of the Gallatin range, fifteen miles away. They have been transported by the great ice sheet that covered the plateau during the Glacial Period and produced many other important changes in the surface geology of the region. There are also several moraines, partly buried under the newer

calcareous deposits, in which we noticed, among other kinds of boulders, blocks of white travertine, evidently derived from springs which must have existed before the Great Ice Age began. These proofs of the great antiquity of the hot springs show how very long the heat takes to die out in the depths of a volcanic area, the surface of which has for ages been devoid of all eruptive action.

From the Mammoth Hot Springs our way led southwards up the Swan Valley, a rugged glen between high pine-clad mountains, and entered the plateau through the Golden Gate, a deep gash in pale orange cliffs of rhyolite, through which the west branch of the Gardiner river leaps down from the table-land above in a series of picturesque cascades. The principal geyser basins are situated on the plateau proper, a thousand feet or more above the level of the Mammoth Hot Springs. From the Golden Gate the road runs southwards along a comparatively level country with bright little lakes, the haunts of beavers and other game, and undulating expanses of grassy meadow and sombre forest. A bold cliff of dark glassy obsidian—the delight of specimen-hunters—follows the line of the road for a considerable distance, and marks the site of one of the old lava-flows of the plateau. Soon the signs of internal heat begin to reappear. At one place is a shallow pool, known as the Devil's Frying-pan, in which the water bubbles and splutters like lard in a frying-pan, as if there were but a thin crust between the outer air and the fiery regions below. The Park contains many exquisite and noble sights, but, as I shall notice afterwards, it has also a few objects of the most hideous and diabolical aspect, which, if less beautiful, are certainly quite as impressive as their more elegant companions.

The three principal geyser basins are stationed along the valleys of the Gibbon and Firehole rivers, which join to form the Madison. In the Norris Basin, situated at the head of the Gibbon river, about twenty-two miles south of the Mammoth Hot Springs, there are some fourteen distinct geysers. Several of these lie in or near a flat depression in the forest, which resembles a lake frozen over with a crust of beautiful white, yellow, or pink siliceous sinter. Here and there the crust is dangerously thin, and is full of holes which reveal seething pools of brilliant sky-blue or emerald-tinted water. That there is no immediate connection between these orifices is, however, clear. As in many of the neighbouring geysers their contents do not boil or overflow in sympathy with one another. The geysers in the Norris basin are not remarkable for their size, but the interest of the place lies in the evidences it shows of the newness of some of the vents, little or no siliceous sinter having as yet been deposited around them. Indeed, within the comparatively short period over which records of the eruptions extend, at least one new geyser has come into existence. Colonel P. W. Norris, formerly superintendent of the Park, who discovered this basin in 1875, has recorded the birth on 11th August 1878 of a geyser named the Steamboat Vent, which constantly belches forth large volumes of steam in a steady column, with a roar like that proceeding from the escape-pipe of a steamboat. The Monarch, another fine geyser in this group, is also evidently

of recent origin. Its orifice is formed by two convergent fissures on the line of a narrow seam at the foot of a bluff of red and orange-coloured rhyolite, the surface of which is here perfectly naked and well fitted for investigation. The main vent is twenty feet long and three feet wide at the orifice, and scarcely any sinter has yet been deposited around it. Eruptions vary in their intervals from year to year, and now usually occur about every twelve hours, but when Mr. Hague investigated the geyser in 1885 it was observed to play every four hours, a column of water being thrown some fifty feet into the air.

The next objects that attract attention, after leaving the Norris basin, are a collection of the curiously coloured caldrons of boiling clay known as the Gibbon Paint-pots. There are in the Norris basin several ugly pools of seething blue-grey mud, from which evil-smelling clouds of steam are constantly ascending, but the paint-pots are neither ugly nor repulsive, and have many points of interest to recommend them.

Half a-mile east of the head of the romantic Gibbon Cañon, at the foot of a steep slope densely clad with pines, are to be seen several hot springs, bubbling up through basins full of brilliant red, yellow, and green clay, and overflowing into rills that meander away through the woods like streamlets of red blood and yellow ochre. These pigments are produced by the iron and other metallic substances which are set free in the process of decomposition of the rock by the hot springs—a process which, as we shall afterwards see, has given rise to some of the finest scenery in the Park. The rhyolite when decomposed produces also a quantity of fine white clay, and there are in the Park many paint-pots in which little or no colouring matter is present. Two exquisite little mud volcanoes or paint-pots of this sort occur some fifty feet up the hillside, above those just mentioned. The clay is nearly white, and is in a very thick viscid state. It is quite impalpable to the touch, and is evidently nearly pure kaolin, which might without further treatment be used for making the finest pottery ware. The principal orifice is surrounded by a circular bank of clay with a crater in the centre about six feet deep. The creamy-looking sluggish contents of the hollow are in a constant state of ebullition, and little puffs of steam burst through all over the surface. Each bubble as it rises swells out until it bursts with a slight explosion, and a small piece of clay is projected a yard or two into the air to drop back into the basin, or fall on the rim of clay which has thus grown up round its margin. As a bubble bursts it assumes for a few seconds the chaste form of a Nile lily or a full-blown rose, gradually fading away and sinking into the soft mass, only to be replaced by another equally beautiful form alongside it.

From the Paint-pots the road down the Gibbon Cañon is wild and picturesque in the extreme, overshadowed as it is by heavily timbered slopes or bare cliffs at some places 2000 ft. in height. Little jets of steam and boiling pools keep us constantly in mind of the heated mass below, while the roaring stream, with its stony bed and foaming cascades, tells of the gradual gouging out of the gorge by the action of surface waters above.

The Lower Geyser Basin, about 11 miles from the Norris Basin, and

4 miles above the mouth of the Firehole river, is the largest of the geyser areas, and covers a tract of some 9 or 10 square miles. There are here 17 geysers, the finest of which is the Great Fountain, which, instead of issuing from a raised nozzle or conical mound of sinter, like most of the others, bursts forth from the centre of a shallow but perfect basin brimming over with sparkling water. The outer rim of the basin, about 40 yards in diameter, forms the top of a low platform some 3 feet above the surface of the surrounding level ground. The formation, entirely made up of siliceous deposits, is diversified by an endless array of forms and colours. At places the sinter is moulded into exquisitely modelled basins and pockets, which cluster round the rim and receive the overflow from the central pool. The basin itself is studded with beautiful tufted masses of sinter, like cauliflower heads, that rise through the water as little islets, and swell up near the central crater into grey rounded lumps of considerable size. The eruptions occur at irregular intervals, and we were fortunate in arriving just in time for a fine display. The water, after a series of preliminary jumpings, rose in an irregular confused conical mass to a height of 50 or 60 feet, as if made up of a bundle of jets each trying which could leap highest, while dense clouds of steam at times completely obscured the watery pile beneath. The whole performance lasted half-an-hour or so, after which the force of the eruptions diminished, and the agitated waters sank back exhausted, leaving the basin brimming over with a steaming, scalding flood which gushed through all the apertures in the lip of the basin, and overflowed from one side pool to another, until it finally poured into the nearest rivulet.

At another part of the Lower Geyser Basin there is a curious collection of "mud puffs," or little mud volcanoes, resembling in some respects the Gibbon Paint-pots, but on a larger scale. The Mammoth Paint-pots, as they are called, are partly formed into a saucer-shaped hollow 40 by 60 feet in dimensions, with a mud rim on three sides about 4 or 5 feet high. In this hollow a white mass of fine viscid mud is constantly bubbling and spluttering like porridge in a pot. On the south end of the basin the rim is low, and forms the edge of a second flat hollow full of pink clay, with its surface all cracked and studded with some 30 or 40 curious little pink, rose-coloured, or occasionally grey, mud cones. These miniature mud volcanoes, or mud puffs, are a foot or two, or even occasionally 3 feet, in height, and some of them squirt little jets of mud 4 or 5 feet into the air in a way most comical and fascinating to behold.

All the more famous geysers are to be found along the valley of the Firehole river in the Upper Geyser Basin. This group is also the largest in point of numbers, as it comprehends no less than 49 geysers, each of which has received a distinctive name.

About three miles from the Great Fountain the west bank of the Firehole river spreads out into a tolerably flat plain, or broad terrace, of white sinter, which occupies the bottom of the valley, and runs into the forest slopes along its sides. In this terrace the early explorers discovered in 1871 an immense pit, from 200 to 300 feet in diameter, nearly full of deep blue water in a state of intense agitation, and often quite obscured by the dense clouds of steam that were constantly being

given off from it. When the breeze wafts this steam aside the walls on three sides are seen to be about 15 feet high, and to be built up of thin laminated beds of sinter, which are being steadily undermined by the water at their base. The side next the river is cut away so as to form an outlet through which the water pours off in channels brilliantly coloured in various shades of yellow, orange, and delicate red and pink. Cliff Caldron—for such was the name originally given it—was some ten years later discovered to be a huge geyser, with powerful eruptions occurring at long and irregular intervals. Colonel P. W. Norris, who observed the outbursts in 1881, named it the Excelsior Geyser, and witnessed upwards of 30 eruptions, varying in height from 50 to 250 feet. No more explosions are recorded till 1888, when the geyser again leaped forth with great energy, and continued in unabated activity all through that summer and the succeeding winter. During these terrific outbursts the Excelsior belched forth as much water as all the other geysers in this basin put together, and raised the level of the Firehole river several inches. As I have already noticed there is no evidence of any direct subterranean connection between the different geysers, but when the Excelsior was in activity in 1888 two of the largest geysers in the basin remained inactive, which would seem to indicate that in some cases there may be an exception to this rule. A short distance from the geyser, on a slightly higher part of the sinter terrace, are some hot springs of exquisite loveliness. The finest of these, the Prismatic Lake, is the largest thermal spring in the Park. It is about 100 yards in diameter, and is generally mantled in clouds of steam which often quite obscure the view. In the centre of the pool the water over the funnel-shaped orifice of the spring, which is in a constant state of ebullition, exhibits a deep blue colour fading away towards the shallower margin into delicate shades of green. Near the edge the basin has a yellow tint, which in turn merges into orange, while outside the rim, which, like that of the Great Fountain, is slightly raised above the general level of the ground, there is a zone of brilliant red passing into purples, browns and greys that gradually fade away and mingle with the greyish-white ground on which they rest. No artist's brush can adequately reproduce the exquisite hues and the dazzling beauty of these springs, which sparkle like gems of the first water and can in their way scarcely be surpassed by the glorious spectrum itself.

Of the larger geysers "Old Faithful" is the most celebrated, not because of his size, but because of the extreme regularity of the eruptions, which take place once every 63 minutes. Visitors are often disappointed at not catching the largest of the geysers in action, but Old Faithful never fails to perform, and sends his noble jet of water 125 to 150 feet into the air with unexceptional punctuality. Like most of the geysers in the Upper Basin Old Faithful rises from the midst of a mound of sinter, which has been slowly built up during centuries of thermal action. Although new geysers occasionally appear in the Park, the wide tracts of sinter and the numerous mounds of extinct geysers clearly show that their action is diminishing steadily, and that the subterranean heat is dying out.

One of the largest geysers is the Giant, and we were fortunate in arriving just before a grand eruption took place. The eruptions occur about once in six days, but at the time of our visit the performance was a whole week overdue, and watchers were anxiously waiting by day and night to give notice when the play was to begin. It is a curious circumstance that previous to 1887 the eruptions always occurred at night, and it is only recently that the Giant has thought fit to appear in sunlight.

When the geysers of Iceland are wanted to spout it is customary to throw in pieces of turf and stones, but a much more efficacious trigger has been found in soap, which seems to have a certain molecular action on the water in the pipe under circumstances not always easy of explanation. The art of soaping geysers was accidentally discovered by a Chinaman who was employed as a laundryman in the Upper Geyser Basin in the summer of 1885.[1] To his amazement he found that some soap thrown into the hot spring, from which he was accustomed to draw his water, produced an eruption resembling that of a true geyser, and tourists who had come long distances to see good eruptions soon began to experiment on the larger geysers with some success. The desire to coax unwilling geysers to perform soon grew so prevalent that the Park authorities were compelled to enforce rigidly the rule against throwing objects of any sort into the springs, some of which have been permanently injured by such treatment. Mr. Hague, who conducted a series of experiments on the action of soap in stimulating the eruptions of geysers, found that some were much more susceptible to this treatment than others. In many of the hot springs and geysers it has been ascertained that the water remains quiet, even if the surface temperature rises to a few degrees above 198° Fahr., the theoretical boiling point for this altitude. The water is thus in a state of unstable equilibrium, and any disturbance may cause ebullition to begin. If soap or, still better, concentrated lye be added, a viscous fluid is produced, which seems to cause the retention of steam, and in the case of superheated waters, when the temperature stands above the natural boiling point, explosive liberation must follow. Old Faithful seemed from the experiments to be proof against such undignified treatment, but some of his more fitful and fickle brethren paid more attention to the Chinaman's artful dodges. Among these the Bee-Hive, which has no fixed period, proved apparently susceptible to the action of soap, but in general it seemed doubtful whether much reliance was to be placed on this method of producing eruptions. Mr. Hague remarks that: "Outside of a few exceptional instances, which could not be repeated, and in which action was probably only anticipated by a few minutes in time, geyser eruptions produced by soap or alkali appear to demand two essential requirements—first, the surface-caldron or reservoir should hold but a small amount of water, exposing only a limited area to the atmosphere; second, the water should stand at or above the boiling point of water for the altitude of the geyser basin above sea-level."

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[1] See paper on *Soaping Geysers* by Arnold Hague, read before meeting of American Mining Engineers at New York, February 1889.

GIANT GEYSER.

The greatest height to which the water is thrown by the Bee-Hive has been computed at 220 feet, while the Giant, which is one of the most violent of the geysers in the Upper Basin, sends up, during a period of from one to two hours, a vast column, sometimes reaching 250 feet in altitude. The Giantess, Castle, Grand, Splendid, and other members of the group, although not so powerful, are quite as interesting in their way, but space and time prevent our lingering longer over this most fascinating locality, and bid us pass on to other equally interesting places in the Park.

Retracing our steps we returned to the Lower Basin and struck off eastwards up the glen of the East Fork of the Firehole Creek, crossing the water-parting between the basin of the Madison and that of the Yellowstone river. The Devil's Staircase, for such is the name of part of the mountain road, or rather track, which we followed, is certainly the roughest piece of road-making that could well be imagined. It leads over the shoulder of a steep wooded mountain, and for several miles consists of little else than a cleared track through the forest, with a couple of deep broad ruts and a high bank between them all studded with stumps, which every now and then threaten to catch the axles of vehicles that go over them. Sometimes the gradient is about 1 in 2, and one rut a foot deeper than the other, the deeper one being on the lower side of the hill, while rough boulders are scattered promiscuously about. Newer and better roads are, however, being constructed, and they will not only contribute to the safety and comfort of travellers, but will also save the great expenditure of horse-flesh that such bad highways entail. So far as my observations in America go, however, the art of good road-making has yet to be learned by our friends across the water. The great defect seems to be the imperfect manner in which the roads are *bottomed*, even if the "formation" on which the bottom rests is well engineered. Roads that are badly bottomed, or not bottomed at all, can never be expected to stand any considerable traffic, even if the gradients are fairly good and the water properly carried off.

The road over the ridge reaches the Hayden Valley about four miles below the outlet of the Yellowstone Lake, and passes close to the Mud Geysers, a group of hot springs and geysers that rise through a series of stratified deposits, laid down at a time when the Yellowstone Lake was much larger than it is now and spread southwards over the entire area of Hayden Valley. The eruption which we saw was more curious than beautiful. A dark grey flood of thick muddy water welled up in the funnel-shaped throat of the geyser, and filled the basin that surrounds it, after which the liquid mass bulged up in a state of violent agitation, and spouted 15 or 20 feet high for several minutes, sending circular waves of dirty mud outwards to the rim of the basin.

There are several other mud geysers, or mud pots, in the vicinity, but there is one that surpasses all the rest in horrible ugliness. The Giant's Caldron, or Mud Volcano, is a crater some 20 or 30 feet deep in the face of a steep wooded slope a short distance from the Mud Geysers. In the depths of this caldron, with grey and slimy sides, a sable pool of noisome mud was continually heaving to and fro, as if

disturbed by some evil spirit of unrest. On the side next the hill there opened into the bottom of the crater a low-mouthed tunnel, and from this grim cavern black waves of boiling mud were continually bursting forth with explosive violence. Each outburst was accompanied by a dismal kind of muffled grunt and a cloud of evil-smelling sulphurous vapour that rolled slowly up the side of the caldron, bleaching the face of the rock above the vent as it curled upwards. With all its efforts, however, the crater never overflowed, as the hideous flood sank back again into its subterranean cavern after the force of each explosion had spent itself. All our party agreed that this gruesome hole was more like a back-door into the infernal regions than anything else that could well be imagined, and that Dante should have seen it when he wrote his *Inferno*, or Bunyan when he described the bye-way into hell.

The Mud Volcano was discovered by the Washburn exploring party in 1870, and Lieutenant Doane says that at that time heavy volumes of steam rose from the crater 300 feet into the air, and from far down in the earth issued jarring sounds in regular beats of five seconds, with a concussion that shook the ground 200 yards away. Each concussion was followed by a great splash of mud, while occasionally an explosion was heard like the bursting of heavy guns behind an embankment, and the earth trembled for a mile around. It was clear that the volcano had not been long in operation, as young pines crushed flat to the earth under the rim of mud were still alive at the tops. The surrounding trees were found covered with mud to a height of 200 feet above the crater, but this was afterwards found to be due, not necessarily to great explosions, but to the action of the steam carrying up the particles in a fine state of division and coating objects with mud when placed in its way. In 1872 Mr. Langford, who had seen it two years before, said that the crater, cone, and loud reports had all disappeared, leaving nothing but the excavated caldron with its seething bubbling mass of mud, in which several tree-tops swayed to and fro. When we saw it in 1891, twenty-one years after its discovery, there could be no doubt that there had been a great decrease in its energy within that period, and future observers may be able to record its further decay and gradual transition into one of the dry steaming sulphur vents so abundant on the plateau.

The Yellowstone Lake is a noble sheet of water, some 20 miles in extreme length, and rudely resembling on the map a coarse hand with a knotty thumb and three fingers. It is situated 7741 feet above sea-level, and is the highest lake of any size in the United States. The sombre pine-forests of the plateau sweep downwards from the old volcanic mountains in the distance to the water's brink, and wooded islands are sprinkled over parts of its surface. Hot springs and bubbling paint-pots are found steaming around its shores, and it is possible to catch a trout in its well-stocked waters and boil it in one of its seething caldrons without moving a foot. A well-marked terrace of old lake deposits forms in many parts a bluff 150 feet above the beach, and in certain directions these beds spread out over a wide tract of country, showing that before the outlet had been cut down to its present level the

expanse of water was very much larger than it now is. The great continental divide passes close to the south-western edge, and there is reason to believe that originally the lake overflowed from this side into one of the tributaries of the Snake river, before the present outlet into the Yellowstone was excavated. The old shore-line and lake deposits are shown on the accompanying sketch-map.

Quite recently a hotel has been erected at the foot of the lake, and a small steamer has been built to carry passengers to the different points of interest along its margin, so that in a few years it will probably become a favourite resort for large numbers of tourists and summer visitors.

From the outlet at the north end of the lake the Yellowstone river winds quietly along the Hayden valley, a flattish pleasant strath with few rocky eminences, once covered by the waters of the ancient lake, as is shown by the old alluvial terraces still to be observed along its sides. After a comparatively tranquil course of some 18 miles the river enters a steep wooded defile, and suddenly leaps down into a rugged gorge over a fall of 110 feet in height. A short distance further on it takes a second bound of 310 feet into the bottom of the Grand Cañon, where it dashes along between high rocky walls some 20 miles in length.

The great falls of the Yellowstone are indeed a noble sight. The water, like that of Niagara, is perfectly clear and free from sediment, issuing as it does from a great lake in which all suspended matter has been retained. It has a delicate sea-green hue, which contrasts delightfully with the warm tints of the surrounding precipices, while the great height of the fall appears magnified and ennobled by the dense volumes of spray which wrap round and quite conceal the base of the watery column.

The Grand Cañon of the Yellowstone, however, far surpasses in beauty anything else in the Park, and, indeed, few more striking and fascinating specimens of rock-colouring and sculpture have ever been described by travellers either in the New World or the Old. At the falls the depth of the gorge is about 700 feet, but this increases to 1000 feet five miles lower down; the height of the cañon walls nowhere exceeds some 1500 feet, while the mouth of the chasm varies from a quarter to three-quarters of a mile in width. It is not, however, the dimensions, which are in no way remarkable, but the wonderful colours and sculpturing that give to the cañon its peculiar interest. It has been gouged by the river out of a thick mass of the pale-yellow or pinkish rhyolite of the plateau, which has become softened and disintegrated by the action of the hot springs and fumaroles, many of which are still to be seen steaming along its walls. We see in this great excavation what must be happening to the old lavas under the geyser basins. The mud, clay, and sinter that the geysers bring up are simply decomposition products of the underlying rock, which must at places be completely honeycombed and disintegrated by the heated waters continually percolating through them. There is evidence to show that this deep gorge is of no great geological antiquity, but has been entirely excavated since the ice age, the rapidity of the river erosion being due to the rotting and softening process just described, which has rendered the otherwise hard rock an

easy prey to the surging waters. Before the Ice Age, as we have seen, the Yellowstone Lake probably overflowed by another outlet, but the eating back of the falls in the stream that preceded the Yellowstone seems to have gone on so fast as eventually to tap the lake at its northern extremity. When once this escape was formed, the augmented river continued to deepen its bed until the whole discharge became permanently diverted into the channel of the Yellowstone, while the level of the lake sank as the outlet was thus cut away, and the waters shrank back to their present diminished area.

The crumbling rhyolite, when thoroughly decomposed, breaks up into white clay, silica, and iron oxide, with a few less important ingredients. As the rate of weathering is far from uniform throughout the mass, the parts which have proved most durable are to be seen projecting all along the cañon walls in a series of massive fretted buttresses, or jagged spurs and pinnacles, of the most ornate and picturesque configuration. The whole gorge is moreover painted in the most brilliant hues, from pale lemon or sulphur-yellow, which predominates, to deep orange streaked with warm vermilion, crimson and purple, which, mingling with the deep green of the pines that clothe the brink of the chasm and are dotted over its rugged walls, make up together a picture of transcendent beauty and magnificence.

With the Grand Cañon of the Yellowstone we completed our inspection of the Park, but did not exhaust the list of attractive places it contains, as want of time prevented a visit to the fossil forests, the old volcanic peaks, and other localities equally full of scientific interest and instruction.

Such is, however, a brief outline of some of the more prominent geographical features of the Yellowstone National Park, and all must agree that the U. S. Government has acted wisely and well in setting apart for all time to come this wondrous and remote region as a glorious inheritance, not for the American citizens alone, but for all lovers of the rare and beautiful in nature.

THE METEOROLOGY OF INDIA AND THE SURROUNDING SEA-AREAS.

By H. N. Dickson, F.R.S.E., F.R. Met. Soc.

(*With Maps.*)

The disastrous famines caused by failures of the rains in India, and the destruction wrought by cyclones in the Bay of Bengal and the Arabian Sea, have led to the establishment of a meteorological system in those parts, which since its commencement in 1875 has become, for both practical and scientific purposes, the most complete and efficient in existence. Its development is mainly due to the work of Mr. H. F. Blanford, as Meteorological Reporter to the Indian Government, and his successor, Mr. J. Eliot, and the services of the department

are duly recognised by the Famine Commission, as well as by the seafaring community at large.

To the scientific meteorologist the endless variety of weather and climate in different parts of India, combined with the comparative regularity of the outstanding features in the annual sequence of changes, afford opportunities of stating many problems in the science with a definiteness and precision impossible either in temperate climates, where the conditions are too irregular, or in tropical climates, strictly so called, where they are too uniform: and the voluminous records of reliable data issued by the department afford corresponding opportunities of solving such problems. This is specially the case in dealing with modern mathematical theories.

It is matter of profound regret that one section of the work of the department, which has cost an immense outlay of time and money, should have to be regarded as fruitless. The climates of many stations in India are obviously exceptionally suitable for observations of the intensity of insolation,—but the discussion of many years' observations at stations all over the peninsula has unfortunately only led to the conclusion that a proper instrument for estimating the power of solar radiation remains to be invented.

The principal work of the Indian meteorological service may be said to consist of forecasts, firstly, of the probable strength of the monsoon and distribution of the rains in each year, and, secondly, of the occurrence of cyclones in the Bay of Bengal and the Arabian Sea. In describing briefly the manner in which the work is performed, it will conduce to clearness to follow the changes in the meteorological elements through a complete average year.

The area under discussion lies between the equatorial belt of calms and rains and the northern tropical calm and dry belt. Under normal uniform conditions, such as occur over the open ocean, we should accordingly find permanent winds, like the north-east Trades, varying in extent and intensity at different seasons. The introduction of a land-surface, plane and with little elevation above sea-level, would give rise in such an area to a thin stratum of atmosphere liable to excessive variations of temperature on account of the heating and cooling of the land; but there would not be much tendency to circulation, for heated air would simply ascend in local vortices and eddies, and, as it would probably be dry, would soon be cooled by adiabatic expansion to the temperature of the strata surrounding it, and the ascending motion would cease; and air cooled by radiation would lie on the surface in puddles like water, without much horizontal motion. We should therefore find land and sea breezes around the coasts, and in the interior a tendency towards anticyclonic conditions in winter, which would become reversed in summer; but in neither case would any marked intensity be developed. The climate would, in fact, much resemble that of the northern part of Central Africa.

But if the supposed land surface be elevated so as to form a cone, or high plateau, with long sloping sides, the thin stratum lying next the surface will, when cooled, tend to flow downwards and outwards with a velocity roughly proportional to the steepness of the slope; and, when

heated, to ascend with considerable velocity for several reasons. First, the upper portions of it will attain nearly as high temperatures as the lower, because the heating effect of the sun's rays is almost as great at the summit of such a slope as at the bottom. But at greater elevations the normal temperature of the surrounding strata is lower than near sea-level; hence the difference between their temperature and that of the thin layer next the land surface is greater. There is thus a greater tendency for the thin layer to ascend, for the same reason that the draught in a chimney is strongest in cold weather: and the increased demand in the upper part of the thin stratum is met by extra supply from the lower part, which in turn causes increased inflow from the sea.

Again, since the current from the sea is nearly saturated with aqueous vapour, its ascent cannot proceed far before condensation is set up, and the enormous quantities of heat liberated in this process go to increase its temperature, and hence still further the ascending tendency. Some idea of the enormous quantity of energy thus developed may be gathered from the fact that a fall of one inch of rain over a square mile of the earth's surface furnishes enough to keep the largest Atlantic liner steaming full speed day and night for seven months.

In the case of India the main features of the land surface are comparatively simple (*vide* Plate I.). The peninsula itself takes nearly the form of an isosceles triangle, having its apex pointing southwards. Along the northern border the range of the Himalayas, of an average height of 18,000 feet, presents a complete barrier, so far as surface winds are concerned. On the western side, parallel to the coast, and separated from it by the narrow belt comprising Malabar and the Konkan, the Western Ghâts extend from Travancore to a short distance north of Bombay, rising to elevations of 5000 to 7000 feet. The Eastern Ghâts are separated from the eastern coast, at distances of 50 to 150 miles, by part of Orissa, the Sarkars, and the Karnatik. They begin in the extreme south-east of Madras Presidency, and extend northwards into Orissa, the average height being 1500 feet. Along with these two ranges the Vindhya Mountains (1500 to 4500 feet), to the south of the valley of the Ganges, form a triangle in which lies the Deccan, a plateau having an average elevation of about 1000 feet, and between the Vindhyas and Himalayas a low-lying belt runs east and west, the eastern portion including Bengal, Assam, Nepal, Oudh, and the North-West Provinces, and forming the basin of the Ganges, and the western Rajputana, Sind, and the Punjab, included in the basin of the Indus. To the north of the Himalayas are the highlands of Tibet and Kashmir, the Kuen Lun Mountains, and the immense desert plains of Central Asia.

The nearest approach to the normal conditions in such an area is naturally found during the "cold weather" proper, which obtains most generally at the beginning of the year. The distribution of temperature over India at that time is extremely uniform, and gradients are therefore everywhere slight. As shown in the chart for December (Plate II.) pressure is highest in the north-west, and decreases slowly towards the south-east, giving in general northerly or north-easterly winds, which are distinguished over both land and sea by their extreme lightness,

especially in Northern India, where they are sometimes even reversed by local causes and replaced by moist southerly winds, producing the "cold weather rains," the distribution of which may be gathered from a study of the annexed Rainfall map.

The increasing power of the sun's rays is felt as early as the end of January, when the rise of temperature initiates the gradual change towards cyclonic distribution. An area of low pressure forms over Orissa, causing the north-east monsoon to cease over that province and Bengal, although allowing it to continue further south in the Sarkars and Karnatik until March. The new wind circulation, which shows itself first as a light afternoon sea breeze at the head of the Bay of Bengal, gradually gains in strength, and penetrates inland up the Gangetic valley as an easterly current which feeds the spring hail-storms, adds to the snowfall on the Himalayas, and is occasionally reflected from the mountains, pursuing its course as a north-easterly wind. In the eastern part of the Arabian Sea the indraught towards the peninsula is shown by a gradual change of direction through north to north-west and west. A similar change of direction takes place in Northern India, and the westerly winds, which become hotter and drier, frequently meet the easterly current just referred to, producing weather alternately dry and scorching, and damp and oppressive, the latter varied by thunder-showers and dust-storms. Lower down, in Bengal, the damper current gives birth to "nor'-westers," a more highly developed form of dust storm. As the "hot weather" season progresses the diminution of pressure increases, and the Orissa depression extends to form a trough along the valley of the Ganges,—shown, in its fullest development, in the Isobaric chart for June (Plate II.).

The first check occurs towards the end of May in Ceylon and Southern India. The sky becomes gradually overcast, and a ground swell from the westward sets in over the sea. Suddenly the monsoon bursts with terrific thunderstorms and deluges of rain. After the extreme south, the rains set in on the Malabar coast, usually in the first week of June. The monsoon current quickly surmounts the Western Ghâts and advances over the Deccan. A few days later the Bombay coast is reached, and then Rajputana and Central India. On the eastern side, Bengal is generally affected in the second week of June, and the current extends up the Gangetic valley through Behar into the North-West Provinces and Eastern Punjab, its progress occupying as a rule about ten days. In Pegu and Arakan the rains usually begin somewhat earlier than in Bengal. The burst of the monsoon occurs in general suddenly, except in Assam, and sometimes in Bengal and Arakan, where there may be, as it were, two or three attempts before the rains are fairly established.

The monsoon current, therefore, appears as a south-westerly rain-bearing wind, which, although not necessarily differing greatly in direction from the prevailing winds at the end of the hot weather, is nevertheless markedly distinct from them, its arrival being for the most part sharply defined. On reaching the southern part of the peninsula the current divides into two main branches, one extending up the western coast into the Bombay Presidency as far as the Satpuras, and the other up the eastern coast into Bengal and the Gangetic valley. Between Rajputana

and the Eastern Punjab the conditions are again unsteady, depending on the relative strength of the two branches of the current. Although much stronger and steadier than the winter monsoon, the south-west monsoon is subject to considerable variations: weak periods occur, during which the wind shifts to a more northerly direction, and there are breaks in the rains. This happens most frequently in the area just mentioned, where the two currents meet, and most seldom in the Deccan, where the monsoon is strongest and steadiest. In an abnormal season, when the monsoon current is weaker than usual, an area of high pressure is developed over Western India, and a dry north-west wind replaces the rain-bearing current. The failure of the easterly Bengal current, which normally "feeds" the trough of low pressure over the Gangetic plains, at the same time causes the axis of that trough to move northwards close to the base of the mountains, thus placing the north-west winds at a still greater advantage, as instanced in the disastrous year of famine 1883, when they extended over Central India into Berar and the Deccan. It would seem that these dry winds are fed from the plateaux of Baluchistan, which rise to an average height of 5000 feet, immediately to the west of Sind, and over which the prevailing winds at the time are north-westerly.

The work of forecasting the probable date of arrival and strength of the monsoon has been undertaken by the Indian Meteorological Department for some years with marked success. The forecasts for the season are issued in the first week of June, and are based on results derived by the method of abnormals from observations of the cold weather snowfall on the Himalayas, the weather of adjacent areas, and the local peculiarities of weather in India itself, immediately before the advance of the currents. The first-named observations may be said to afford information as to the probable strength and penetrating power of the current itself, the second as to the chance of its being deflected from its normal course, as, for example, when a persistent depression over Burma may be fed by the Bengal current, and the third as to the local distribution of the rainfall, although the bearing of each class of data on the others is extremely important.

Recent investigations leave little doubt that the monsoon current is an extension of the south-east trades of the southern hemisphere, which are drawn towards the low-pressure system over the land, breaking through, as it were, the equatorial belt of calms. The sudden bursting of the rains has not as yet been fully explained. It appears reasonable that the extension of the trades over the equatorial belt should take place suddenly, but the regularity of the time and manner of its occurrence make it difficult to account for it by the heating of the surface of the peninsula alone. The rise of temperature over that area takes place most rapidly some time before the burst of the monsoon, and no circulation of great intensity is set up, the indraught from the sea giving rise only to local intermittent currents of the nature of sea-breezes, which are powerless to penetrate inland or to feed an ascending current even where condensation commences. The moderate elevation of the of the peninsula, and its limited area, would seem to render even the

intense insolation inadequate to produce an ascending current of the required volume.

The cause may be, perhaps, most hopefully looked for over the continental surface of Central Asia. From the nature of that surface, its position, and greater elevation, the annual rise of temperature not only occurs later than in India, but the establishment of cyclonic conditions, *i.e.* of an ascending current, takes longer, on account of the intensity of the high-pressure conditions produced by the great cold of winter: thus, even in May the prevailing winds over a large part of it still indicate anticyclonic circulation. When the ascending current, however, finally replaces that circulation, the same circumstances which delayed its commencement will give it a volume and extent enormously greater than any similar current over the peninsula.

Now, the Himalayas form a complete barrier to all surface winds; hence we have two ascending currents, one, the smaller, fully developed over the peninsula, and another, much the greater, in process of formation, and gradually extending into the upper atmosphere. These are at first practically independent of each other, until the second attains an elevation of 10,000 feet or more and the barrier is surmounted. It is possible that on reaching that point the larger vortex absorbs the smaller, just as two cyclones unite at ordinary levels, and we can conceive that the junction will cause a sudden demand on the lower portion of the latter, which is in this case supplied by the south-west monsoon. Some such process is at least suggested by the fact that prolonged and excessive snowfall on the Himalayas and in Tibet and Kashmir, which means a severe and protracted winter, and therefore a late ascending current over Central Asia, is followed by a weak and late monsoon, and that such a monsoon is often replaced in Northern India by descending currents from the Baluchistan highlands, again probably a result of a weak ascending-current over, or at least weak indraught towards, Central Asia. The data for discussing these questions must be derived from observing-stations in Tibet and Mongolia, and from observations of cirrus clouds in the neighbourhood of the Himalayas, and are as yet very meagre.

The monsoon-current may be imagined as advancing with a wedge-shaped front, increasing in height towards the rear, although never attaining a great elevation. The condensation set up on its meeting an obstacle must therefore depend largely on the angle at which that obstacle lies to the advancing front. Thus on the Malabar and Konkan coasts, and again to the north of the Bay of Bengal, where it encounters ranges of mountains almost at right angles, the current is forced to ascend a slope which covers but a small area on account of its steepness, and excessive rainfall is recorded. With this there is also liberation of vast quantities of heat, and the current in the former case easily surmounts the Western Ghâts, and is strong and steady over the Deccan. On the face of the Ghâts the average precipitation may amount to 250 inches, while on the Khasia mountains as much as 264 inches has been recorded during August alone, the annual mean at Chirra Punji being 474 inches (*Vide* Rainfall map. Plate II.).

The south-west monsoon continues throughout July, which is in general

the month of heaviest rain, and August: it begins its retreat early in September, and before the close of that month has ceased over the Deccan, the Central Provinces, and the western coast, where the increasing pressure causes an extension of light north-easterly winds. The rains continue in Assam and Bengal until October, and as the current retreats into the Bay it is deflected to the westward, and from a course almost parallel to the eastern coast turned to one at right angles. Hence, as the centre of low pressure moves southward, the heaviest rainfalls of the year are experienced in the Sarkars and the Karnatik during October and November.

The "cold weather" conditions are thus gradually re-established, and we are brought back to our starting-point.

In investigating disturbances in prevailing weather, the first work of the Indian Meteorological Department was naturally to determine fully and accurately the diurnal barometric curves. This has now, in so far at least as the sea-areas are concerned, been accomplished; and its value, especially to mariners, is incalculable, for in many cases of disturbance the barometric changes are extremely small, and may often pass unnoticed, even with the most careful observation, until too late.

The storms of the Indian seas are divisible into two distinct types—the cyclonic storms of the rains proper, which are confined to the Bay of Bengal, and do not often develop sufficient violence to be worthy of the title of cyclones—and the cyclones of the transition periods preceding and following the advance and retreat of the south-west monsoon. During the cold weather period the whole area is practically free from cyclonic disturbance, and during the rains storms are seldom met with in the Arabian Sea.

With one exception, in September 1888, all the Bay of Bengal cyclones traceable to their source have originated within the Bay itself. The storms of the rains usually form, during June, July, and August, quite at the head of the Bay, and in September a little further south, although still to the north of lat. 17° N. They occur most frequently during the changes preceding and following the breaks in the rains, and seem to develop more energy when the changes are important: thus, an early retreat of the monsoon from Upper India frequently coincides with violent storms in the Bay. The path followed by these disturbances is generally north-west or west, the tendency being to traverse the trough of low pressure over India; and, indeed, the burst of the monsoon sometimes takes place with the advance of a cyclonic storm, causing the rains to extend rapidly into Behar instead of occupying a week or ten days in the passage.

The most prominent feature of the storms of the monsoon period is the absence of a well-defined central calm area. The barometric depression at the centre is small, rarely falling below 29·00, and the centre, as shown by the isobars, does not coincide with the centre of wind circulation, but lags behind it, especially over the sea, the arrangement becoming more symmetrical when passing over a land surface. The strongest winds occur in the south and south-east quadrants, and are apparently an increase of the monsoon to form a feeding current. The

behaviour of the whole system is similar to what might be expected in a vortex with its base in a plane perpendicular to its axis, the upper end of that axis being inclined from the vertical in a south-easterly direction over the sea, but tending to assume a vertical position on reaching land. The weight of evidence, however, goes to show that the light winds of the northern and western, or advancing, quadrants are due to the fact that the current fed from the other quadrants is ascending, and it is in front of the centre that the greatest condensation takes place. It would seem that the principal seat of condensational energy in these storms is at no great elevation, probably within the region affected by the monsoon current. They are almost invariably arrested and broken up on meeting even a low range of hills like the Eastern Ghâts.

During the transition periods, before the middle of June and after the middle of September, that is, on the outskirts of the advancing or retreating monsoon, disturbances are met with both in the Bay of Bengal and the eastern part of the Arabian Sea, of which rather more than half resemble the cyclonic storms of the rains. The other half include the true Indian cyclones, probably the fiercest and most destructive hurricanes which beset the sea, through which no ship can hope to pass scatheless. The typical cyclone consists of three quite distinct parts: the outer storm area, in which winds of force 6 to 9 prevail: the inner hurricane area: and the central calm. The first of these may, in the Arabian Sea, extend several hundreds of miles from the centre in any direction, but in the Bay of Bengal usually reaches furthest to the north and east, where the greatest indraught takes place. Its presence is seldom marked by any considerable barometric change, even in the immediate neighbourhood of the hurricane area. The most intense rainfall probably occurs in the cyclones of the Bay, on the western side, where the winds, *i.e.* the horizontal movements, are lightest, and the ascending current is fed by humid southerly winds which sweep round the eastern and northern quadrants as moderate to strong gales. In the Arabian Sea cyclones the ascending current is more frequently found in the northern quadrant, where winds are accordingly light and rainfall heavy.

In the inner area, which is usually separated from the outer part of the storm by a sharply defined boundary, the winds are of indescribable fury, raising the sea in high parallel waves which may travel great distances. Rain falls in torrents from an overhanging bank of dense black nimbus, within which intense electrical activity is manifested by continuous vivid lightning. The barometric fall in this area is large, sometimes excessive, as in the case of the False Point cyclone of 1885, where a fall of over 1·8 inches was observed in 1½ hours, followed by an equally rapid rise; the minimum reading being 27·1 inches, the lowest ever recorded.

The central calm, which is of comparatively small extent, seems to be generally rainless, and there are accounts of cases in which butterflies, insects, and birds have covered the decks of ships within this area. From this it would seem that there is no current either ascend-

ing or descending directly over the centre of the cyclone, and it is remarkable that the presence of animal life is oftenest met with at considerable distances from land. The wave motion set up in the hurricane area produces a peculiar cross sea described as "pyramidal," in which there is little or no motion of translation, and which frequently tries vessels more severely than the violence of the hurricane itself. The centre of wind circulation in the true cyclone always coincides with that of lowest pressure.

As before stated, the cyclones of the transition periods originate for the most part on the outskirts of the south-west monsoon current. In the Bay of Bengal the usual path is either westerly or northerly, the north-west angle of the Bay being for some reason avoided, especially in November. The Arabian Sea cyclones originate near the Maldivhs or Lakadivhs, and during the pre-monsoon period follow a curved path, the vortex of which is near Bombay, towards the Kuria Muria Islands; while the path in the post-monsoon period runs first north-west, then curves through north and north-east to east, and terminates on the Konkan or Kathiawar coasts. It would seem that the true cyclone has its principal focus of condensation at a considerably greater elevation than the cyclonic storm of the rains, for, although it is difficult to prove completely a case where a cyclone has really crossed the peninsula, it is certain that some have acted as though they did. The lower part of the system appears to be broken up by such obstacles as the Western Ghâts, the upper part remaining intact, and to be re-established after some progress seawards has been made. The behaviour of such cyclones, which, it should be said, always begin in the Bay of Bengal, presents problems of a somewhat formidable nature, whereof the solution would probably throw much light on the relation of the monsoon itself to the Central Asian up-current.

The work of the Indian Service in this connection is abstracted in the four volumes of *Cyclone Memoirs*, published since 1888, and in Mr. Eliot's *Handbook of Cyclonic Storms in the Bay of Bengal*. In these are set forth the histories of all the cyclones concerning which any reliable records exist, and from the facts thus elicited empirical rules are deduced, primarily for the use of sailors, but also to afford a basis for scientific discussion. The additions to knowledge contained in these books, especially when collated with the work of Meldrum in the Southern Indian Ocean, and of the London Meteorological Office in the western part of the Arabian Sea, must be extremely suggestive to any one interested n the present crisis in theoretical meteorology.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

At a Meeting of the Society held on the 25th February at Edinburgh, Professor Cargill G. Knott read the paper we published last month on "Japanese Characteristics." Dr. John Murray presided, and Mr. Coutts Trotter moved the vote of thanks to the lecturer.

On the following evening Professor Knott repeated his Address at a Meeting the Dundee Branch of the Society, the Rev. Colin Campbell being in the Chair.

Professor Knott read the same paper to the Aberdeen Branch of the Society at a Meeting held on the 1st March. Mr. William Keith presided on the occasion.

The Glasgow Branch of the Society held a Meeting on March 24th, when Professor Cargill Knott read his paper on "Japanese Characteristics." Mr. Renny Watson, who presided, took occasion at this Meeting to present to Dr. Thomas Muir the Honorary Diploma of Fellowship, which the Council had awarded him in recognition of his services to the Society and to Geography. Dr. Muir has been appointed Superintendent-General of Public Education at Cape Colony.

The Society held a Meeting at Edinburgh on 24th March, Mr. J. B. Sutherland presiding, when Mr. Henry M. Cadell, of Grange, read a paper on "The Yellowstone Region and its Geysers." A vote of thanks was awarded to him on the motion of Mr. Ralph Richardson, Hon. Secretary of the Society.

All the above lectures were illustrated by lime-light views.

Dr. Hugh R. Mill was entertained at Dinner by Members of the Society's Council and his friends, on the occasion of his leaving Edinburgh to assume the Librarianship of the Royal Geographical Society of London. The Dinner was given in the Waterloo Hotel, Edinburgh, on April 3rd. Professor James Geikie, F.R.S., was in the Chair, and proposed the Toast of the evening. Mr. Ralph Richardson and Mr. J. G. Bartholomew acted as Croupiers.

The Inaugural Meeting of the London Branch of the Society was held at 20 Hanover Square on the evening of the 4th April. The Marquis of Lothian, K.T., Vice-President of the Society and Chairman of the London Branch, presided. There was a large attendance. Among those who honoured the Society by accepting invitations to be present on the occasion were the Presidents and officials of the leading scientific Societies in London, the Agents-General for the Colonies and a number of public officials. The Scottish Office was represented by the Chairman (the Secretary for Scotland) and Mr. William C. Dunbar, C.B. (the Assistant Under-Secretary). The Inaugural Address was delivered by Mr. James Bryce, LL.D., M.P., who took for his subject "The Migrations of the Races of Men, considered Historically." Mr. Bryce's Address, together with the speeches made on the occasion, will be published in a subsequent number of the *Magazine*. On the motion of Colonel Sir Charles Wilson, seconded by Mr. E. G. Ravenstein, Mr. Bryce was cordially thanked for his lecture. A hearty vote of thanks was awarded to the Chairman on the motion of Mr. F. Faithfull Begg.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.,

Assistant Librarian, R.S.G.S.

EUROPE.

The Baltic Canal.—King Christian VII. of Denmark constructed in 1777-84 the Eider Canal, which commences at Holtenau in the harbour of Kiel and joins the Eider above Rendsburg. It is still in use, but it has five locks and is navigable only by vessels drawing not more than eight feet of water, so that it is insufficient for the requirements of the present day. The dangers of navigation round the north of Denmark and the onerous tolls levied in the Sound decided the German Reichstag to construct a new canal, connecting the Baltic and the North Sea, and the undertaking was commenced in 1887. This canal, starting at Brunsbüttel at the mouth of the Elbe, crosses the low and

marshy tract on the banks of that river, and then passes through the lake of Kuden. It cuts through the watershed between the Elbe and the Eider near to Grünenthal, enters the latter river at Schülp, passes through Westerrönfeld and Rendsburg, and then takes up the course of the old Eider Canal, avoiding, however, its windings. The length of the canal is 61 miles; it will have only two locks, one at each extremity, to maintain the level of the water in the canal in spite of the variations of tide in the two seas. The lock of Brunsbüttel may be opened during three or four hours each day, that is, during the ebb tide, while the other, at Holtenau, need only be closed during the spring tides and when certain winds are blowing—perhaps twenty-five days in the year. This waterway will not only be advantageous in affording vessels a means of escaping the dangers already referred to, but will also considerably abridge the distance between the two seas, and provide a passage for the German navy in time of war. It will probably be opened in 1895. *Bull. de la Soc. R. Belge de Géogr.*, No. 6, 1891.

The Population of France.—The census of last year shows that the increase of population continues to diminish, and in an ever greater ratio. In 1891 the total population was 38,343,192, or 124,289 more than in 1886, whereas during the period 1881-86 the augmentation was about 545,000. Again, in 1886 the population was increasing in 58 departments out of 87, while in 1891 only 32 showed an increase. The department of the Seine has gained 180,000 inhabitants: the rest of the 32 consist of the manufacturing departments of the north and the maritime departments. As a rule the towns are increasing, but it is at the expense of the country, as is proved by the birth-rate, which has never been so low. There are now 56 towns with a population of over 30,000 each.

Population of Hungary.—The population of this country on December 31st 1890 was 15,133,793 (excluding Croatia). There were 1018 women to 1000 men, if the army be included in the calculation. Of these 7,361,207 were Magyars, or 48·64 per cent of the total, whereas in 1880 the percentage was only 46·65. After Magyars come in numerical order Rumanians, Germans, and Slavs. The increase of the urban population has been very marked, amounting to 10·23 per cent. Budapest has increased by more than 40 per cent., and has now a population of 506,384; Szegedin has 87,410 inhabitants; Szabadka 73,526; Debreczen 58,952; Hódmezö-Vásárhely 56,626; and Pozsony (Pressburg), 56,048. These are the towns containing more than 50,000 inhabitants. The towns with more than 20,000 have increased by 10, and now number 44. The Magyars are in the majority in all these towns except Pressburg. *Bull. de la Soc. Hongroise de Géogr.*, xix. Année, Nos. 9-10.

Pantelleria.—*Neptunia*, No. 10, 1891, contains a few details of the physical formation of this island, which was affected by the late subaqueous irruption recorded on p. 48 of this volume. It is situated at a distance of 87 miles to the south-south-west of Trapani, in Sicily, and 47 miles from Cape Bon. It has an area of 40 square miles, with a coast-line of 25 miles, and its surface is much diversified. In the centre rises a peak to an elevation of 2730 feet, the slopes of which extend to the extremities of the island, retaining a greater altitude on the east than in other directions. On the summit is a crater, 88 feet deep, which in rainy weather is transformed into a lake. The soil is entirely volcanic. In the lower parts there are woods, and in the valleys grow figs, vines, and vegetables, while in the north are fine groves of olives, chestnuts, and oaks. The inhabitants, who speak a mixture of Italian and Arabic, dwell in five villages. Oppidole or Pantelleria is the capital. The harbour is small, and difficult of access in bad weather.

ASIA.

Viticulture in the Caucasus.—The Italian Consul at Batum has made a detailed report on the cultivation of vines and the manufacture of wine in the Caucasus (*Boll. del Min. degli Affari Esteri*, Jan.-Feb. 1892). The lands on which vines are grown lie chiefly along the banks of the rivers Rion, Kura, Aras, Terek, Kuban, and Kuma. The soils of these districts possess different qualities, and the climatic conditions and methods of cultivation are very varied; consequently, numerous kinds of wine are produced. Great improvements might be made in the selection of suitable kinds of vine for each locality, and in the process of manufacturing wine. Something has been done in this direction by rich proprietors, and various means have been tried to protect the vines from the phylloxera, mildew, and oïdium. In spite of the obstacles referred to, viticulture has been greatly extended during recent years, and 329,940 acres were devoted to this form of cultivation in 1889, and 4,074,136 gallons of wine were produced in 1888.

Central Asia.—In a paper contributed to *Petermann's Mitt.*, Bd. 38 No. 3, M. Bogdanovitch gives some details concerning his travels with the Pevtzov expedition, which have not yet appeared in these pages, especially on the excursions he made from Nia into the Kuen Lun mountains. In the longitudinal valleys of the Karangu range he noticed that the bottom was veiled in thick mist, while mountain pastures were free from mist and snow and warmed by the beams of the sun. Hence, herdsmen congregated at a much greater elevation (9000 to 10,000 feet) than in the basin of the Tisnaf, where transverse valleys are the rule. The sands of South Kashgaria depend, as regards their movements, to a great extent on the direction of the wind. The westerly and north-easterly winds change the form of the sand-heaps without altering their position, whilst in winter contrary winds arise owing to the cyclone then existing in Kashgaria. Consequently, a clear zone is formed at the foot of the Kuen Lun mountains. Sand cannot have been the principal cause of the downfall of the deserted cities of this region, since their sites are still surrounded by woods of certain kinds of poplar (*Populus euphratica* and *P. pruinosa*), characteristic of Central Asia, which to a great extent prevent the encroachment of sand. From Nia M. Bogdanovitch made also excursions into the "Russian Mountains" of Prjevalski, visiting the gold-washings of this region, and passed over into Tibet. This part of the Kuen Lun is known to the natives by the name of Ak-kar-Tchekyl-tagh, or Snow-white Rocky Mountains, which exactly describes them. In the narrowest part, on the meridian of Nia, they consist of a series of sharp ridges, 13,000 to 24,000 feet high. The country is exceedingly desolate; there are no woods or green meadows. Ascending the valley of the Saryk-tus, M. Bogdanovitch passed the lake Shor-kul, 14,400 feet high, and reached an altitude of over 19,000 feet, where the boiling-point thermometer stood at 176·5° F. Here, on the southern slope of the Kuen Lun, the snow-line, owing to the excessive dryness of the air, was at a height of over 18,000 feet, whereas on the northern side its mean position was 14,000 feet. M. Bogdanovitch crossed the Kuen Lun for the last time from Mondalyk, to the south-east of Cherchen, following the Akka-tagh valley, which, though more than 14,000 feet above sea-level, abounds in rich pastures, being irrigated by numerous streams. Herds of antelopes, wild asses, and wild yaks were observed for the first time. This is the only place near to North-Western Tibet where forage can be procured, and, being connected with that country by an easy pass, forms a suitable starting-point for expeditions in that direction.

The Population of Afghanistan.—A census lately taken by order of the Amir shows a considerable reduction in the population of this country. In the district of Kandahar alone the population has decreased by 10,000 since the census taken under Shir Ali, great numbers of the natives having migrated into India and British Baluchistan. In Turkistan a similar movement has taken place. Whereas, under the predecessors of Abdurrahman there were 16,000 houses in Tashkurghan, now scarcely 6000 are left. The Usbegs have fled across the Oxus to Bokhara, in order to escape from the oppression of the Amir.—*Deutsche Rundschau*, Jahrg. xiv. Heft 6.

The Upper Irrawaddy.—Some further exploration of the Upper Irrawaddy has been made by the north-east column, now operating against the Kachins in Upper Burma. The two head streams of the Irrawaddy, the N'maika and Malika, unite a little below 26° N. latitude, the former being the eastern and larger branch. It has been decided that the true source of the river must be looked for up the N'maika, the water in which is much colder than that of the other stream, proving that it comes from the snows. The Malika was explored in its upper part, called the Kamti country, first by Lieutenant Wilcox in 1828, and after a long interval by Colonel Woodthorpe in 1885, while the section between the confluence and the Kamti tract was traversed by Major Hobday and Lieutenant Eliott last year, so that the entire course is now pretty well known. The direction of the N'maika is also approximately known, but the river itself is hidden by hills, and its geography is at present a sealed book, which the officers on the frontier hope to be able to open up. The natives say there are only three points where this river can be crossed and access gained to the country intermediate between the two branches, and that these are very difficult during the rains, when the river becomes a roaring torrent, foaming down with irresistible force over its rocky bed. The Burman explorer who was sent out in 1880 reported that the N'maika bifurcated higher up, one of the streams flowing from the Naungsa lake at the foot of a snowy range of mountains; but no information has been obtainable regarding the position of this lake, and it has been almost conclusively demonstrated that the N'maika receives no large volume of water from any lake-source, although it is probable that a large stream flows into it from the east, several days' march from N'sentaru. All information regarding the head waters of the N'maika is very wild and hazy, and there seems to be no trade there.

The Blow-pipe and Bow in the Eastern Archipelago.—A line drawn through Flores to the east of Mangarai and Buru, passing to the west of Almahera and to the east of the Philippine Islands, marks the limit of the bow. Where this weapon is found to west of this line it may be shown to have been introduced in recent times. Another line, which from the west of Sumba passes to the east of Sumbawa, Celebes, and the Philippines, is the eastern limit of the blow-pipe. The peoples who use each of these weapons form a distinct family as far as language is concerned.—*Globus*, Bd. lxi. No. 10.

Borneo.—In *Natural Science*, vol. i. No. 2, Dr. F. H. Hatch describes the physical features and geology of the island. It measures 675 geographical miles in each direction, from north to south and from east to west, and has the enormous area of 219,034 square geographical miles. Proceeding from an elevated area in the centre, the radiating lines of water-parting divide the island into northern, southern, western, and eastern catchment-basins. The watersheds, however, are not continuous mountain chains, but consist of short ranges and isolated groups. The central mountain tract has a north-easterly and south-westerly strike, and

culminates in two peaks, the Gunong Tebang and Gunong Apo Botau, from 5000 to 6000 feet high. The highest mountain in the island is Kina-balu, in the north, which has an elevation of 13,698 feet ; another important peak is the Rajah Bukit in the south-western chain—the Olympus of the Dyaks—7000 to 8000 feet high. In the central mountains rise all the principal rivers—the Barito, which flows to the south, the Kapuas to the west, the Rejang to the north, and the Mahakkam to the east. The first is 570 miles long. Undulating country surrounds the hills which, in its turn, is bordered by dry plains ; these, again, pass into the swamps and morasses of the coast. In consequence of this configuration of the surface, the rivers exhibit three distinct phases. In the upper course they rush over rocky beds, with cataracts and shifting islands of pebbles. Their middle courses lie in more level country, and frequently develop a succession of lakes ; in the rainy season the surrounding country is often flooded for miles, while in the dry season the water recedes, leaving a black fertile soil with small patches of water. Channels running across the loops are a common feature, and similar channels often connect two distinct rivers. In their lower courses the rivers run through flat swampy country fringed with mangrove, *nipa* palm, etc. This lagoon district is daily inundated at high-water. A large amount of mud is carried down the rivers, and is deposited along the coast, and in some places as far as eight to ten nautical miles out to sea. The mud-flats are often protected by coral-reefs, and the rapid growth of jungle vegetation assists in the displacement of the coast-line. The forward movement of the mangrove woods has been estimated at more than one hundred yards in forty years. The matted roots of the *nipa* palm, which flourishes both in salt and fresh water, also serve to retain the flotsam of the rivers.

Census of British North Borneo and Labuan.—The total population reached by the census of 1891 was 67,062 in Borneo and 5853 in Labuan. Only 160 persons of British parentage live in Borneo and 21 in Labuan. From certain districts no returns were made, and the superintendent believes that the actual number of persons in the two territories amounts to about 120,000.—*Brit. N. Borneo Official Gazette*, Feb. 1st.

Siam.—A Parliamentary paper, *Siam, No.* 1 (1892), *C.* 6558, *Report on a Journey in the Me-Kong Valley*, by Mr. W. J. Archer, First Assistant in H.M. Consular Service in Siam, contains some interesting notes on a region very little known, and which are especially valuable as regards its economic importance and the prospects of trade. Among the inhabitants of all the Shan and Laos districts to the north of Siam proper Mr. Archer found a general westward movement setting towards the more fertile regions, where the population, owing to the arbitrary deportations on a vast scale which have usually followed a campaign in those countries, is still comparatively sparse. There is, for instance, the great fertile plain in the valley of the Me-kok, and a still greater, not less than 400 square miles, in Chieng Sen, still almost unpeopled. The country to the eastward, viz. the State of Luang Prabang, with its dependent districts to the north and east, as well as the valley of the Me-Kong south of Luang Prabang, are to a great extent, Mr. Archer says, mountainous and barren, and incapable of much development. Between the Me-Kong and the Nam U., however, is an extensive salt-producing district, lying on both sides of the water-shed, the salt being got partly from wells, partly by scraping it from the soil. This is beaten hard, and covered with about an inch of loose earth, through which the salt effloresces, the same earth, after the salt has been washed out of it, being spread over the surface every five days, and the process repeated. The supply of salt might probably be greatly increased by

different modes of working, but there is a dread of irritating the local spirits by any such innovations.

Luang Prabang, from Mr. Archer's description, is a much more insignificant-looking place than is usually supposed. But the administration is good, and it has, besides, the largest market of any northern town after Chieng-Mai. The coinage is curious. Indian rupees pass here as everywhere else; then there are long, narrow, lozenge-shaped pieces of silver, with curious marks; others slightly hollow in the centre; semi-globular pieces of silver, from which pieces are cut off for 'change'; and the cowrie, the original coinage of Siam, still passes current here at the rate of 2400 to the rupee.

In the eastern dependencies of Siam the French are rapidly encroaching, though how this movement is viewed by the Siamese Mr. Archer does not tell us. He describes, however, the attempts to introduce a trade in French goods, which he thinks cannot succeed, partly owing to the poverty of the people and the consequent absence of demand for fancy articles. The only imports of any consequence at present are English hardwares and cotton goods, against which the French cannot compete; though, of course, if the country were annexed and prohibitive duties laid upon all goods other than French, the case would be altered. It seems very unlikely, however, that the Me-Kong can ever become a trade-route from the sea, owing to the character of the stream and its formidable rapids; and communication in a direct line eastwards from Me-Kong to the sea hardly exists, and would be difficult to make. Further south, and west from the Me-Kong, the regions around Khorat are more productive, and their commerce would naturally converge to this town as a centre, its natural outlet being towards Bangkok; and the first sod of the railway from Bangkok to Khorat has, after considerable opposition, just been cut.

As regards the question of opening up the trade with Yunnan and the neighbouring Chinese provinces, with which Mr. Holt Hallett's scheme has made us familiar, Mr. Archer considers that although the route through Chieng-Mai and Raheng to Moulmein is certainly the easiest, still, with improved communications in the Shan States, whatever trade there is will eventually find its way direct through these states to Burma. It would have been of much interest to geographers if Mr. Archer had gone into details as to some such route. He believes that a line up the valley of the Upper Me-Kong, from Chieng Sen to Yunnan, would offer few difficulties; and, he considers, a line might with equal ease be made from Bangkok, up the courses of the Me-nam and Me-ping to Raheng and thence by Lakon to Chieng-Sen, and this would pass through some of the richest parts of Indo-China; but, he notes, the Yunnan caravans returning from Moulmein drop nearly all their goods, chiefly woollens and cottons, at the principal Shan towns, and carry very little as far as Yunnan, the exports from that province being at present inconsiderable. In fact, but for the traffic to these places *en route*, the caravan journey would not be remunerative.

Mr. Archer gives some interesting information about the different races inhabiting the country. Of the more savage or simple tribes many are not aboriginal, but have pushed down, some within comparatively recent times, southward and westward from China—others again, as the Khamas of Luang Prabang, and the Lawas further west, are no doubt true aborigines. They are all more or less oppressed by the Laos, who, like the Siamese further south, arrogate to themselves the name of *Thai*, *i.e.* free, while designating—and treating—the hill tribes as *Kha* or *Khoi*, *i.e.* slaves. At Luang Prabang gold ornaments are *de rigueur* for the well-to-do classes, as the hill people wear silver. The differences between the eastern and western Laos Mr. Archer attributes to the influence on the former

of Cambodia and on the latter of Burma. Meanwhile the old distinction between these two branches as "black-bellied" and "white-bellied," *i.e.* tattooed and not tattooed, is becoming effaced, as the practice of tattooing is coming into fashion among the hitherto white-bellied or eastern branch. Mr. Archer notes further that in Siam proper the admixture with Malays and other southern races and immigrant Chinese has so altered the type that the difference between the Siamese and either the eastern or western Laos is greater than that between these last two.

The Port of Yokohama.—The bay of Yokohama is spacious, has good anchorage, and, at no great distance from the shore, is deep enough for the largest vessels. Being, however, only an open roadstead, it is exposed to the violence of typhoons. To afford some security against those winds a new port is now being constructed. It will be enclosed, the Italian consul states in the *Boll. del Ministero degli Affari Esteri*, Jan.-Feb. 1892, by two breakwaters, about a mile and a mile and a quarter long respectively, leaving a space of 800 feet for vessels to enter the port. An iron pier, 1900 feet long, will also be constructed, and be connected by a line of railway with the station of Yokohama. The surface of the water in the port will have an extension of more than two square miles. Dredges are in operation, increasing the depth of the water where it is less than 27 feet. A graving-dock is also projected. These works were commenced in 1889, and it is hoped that all, with the exception of the iron pier, will be completed about the end of 1893.

AMERICA.

Irrigation in the United States.—Mr. F. H. Newell has forwarded to us the *Census Bulletins*, Nos. 35, 60, 85, 107, 153, and 157, which have been prepared by him. They deal with the lands under irrigation in the States of Arizona, New Mexico, Utah, Wyoming, Montana, and Idaho. The term "irrigation lands" is here understood to mean those on which crops were raised by the artificial application of water during the year 1889. Grazing lands and those on which ditches have been digged, perhaps destitute of water at present, or for which merely water rights are claimed, are therefore excluded. Two-thirds to three-fourths of the farms in the States mentioned, and in the case of Utah nine-tenths, depend on irrigation. In most parts the present supply of water is barely sufficient to fertilise the land under cultivation, and the crops of later settlers suffer during the dry season, or the farms on the higher courses of the rivers monopolise the supply to the detriment of the lands on their lower courses. In the rainy months there is often an excess of water, which at least runs to waste if it does not cause damage by flooding, while in July, August, and September there is often a scarcity. It is mentioned in *Bulletin* No. 157 that in Idaho only one twenty-fifth of the average annual rainfall, 15·61 inches, falls during these months. Consequently, to obtain the maximum utility from the rainfall and increase the area of cultivable land reservoirs will have to be constructed. This undertaking will involve the reconcilement of many opposing interests. In Utah the difficulty has already been felt in connection with the Salt Lake. The owners of land on the shores of the lake naturally desired to keep the level of the water low that their property may be more extensive, while those on the River Jordan suffered, in consequence, from floods in wet weather and drought in the summer months. A compromise was effected in 1885, by which it was agreed that the water should be kept at a certain level, and by an act of Congress in 1888 the lake and adjoining land were segregated as a reservoir. At present the first cost of water right is $10 to $13 an acre in many of the States, and much less than this in Montana and Wyoming, and the annual expenditure

varies from a half to one and a half dollars. What change in this respect would follow from the introduction of storage is not estimated. A large amount of detailed information is contained in these *Bulletins* which cannot be reproduced in a concise form. The collective report which is to be published will no doubt give a general survey of this interesting subject. The area of fertile soil contained in these eastern States is very large, and the climate is thoroughly suited to agriculture, so that irrigation alone is requisite for far more extensive cultivation.

Dutch Guiana : the New Territory.—Now that Holland, by the decision of the Tsar, has been put in possession of about 1,670,000 acres of valuable land, the Dutch will have to provide some means of communication with Surinam. In the *Tijdschrift van het Kon. Nederlandsch Aardrijkskundig Genoot.*, Decl. viii. No. 8, Captain G. P. H. Zimmermann discusses this question. At present there are three ways by which the new territory may be reached. The first, and most frequented, is along the Maroni, which forms the boundary between French and Dutch Guiana. The navigation of this river is rendered difficult at the mouth by numerous banks, and further up by shallows and rocks. Small steamboats can ascend as far as 5° 10′ N. lat., or about 5 miles below Armina ; beyond this point canoes only can be used, and these have to be unloaded and carried past the falls. The second route follows the Surinam from Paramaribo down to the mouth of the Commewyne, and ascends this river, the Cottica, and the Courmotibo to the Wane Creek, which enters the Maroni at 5° 38′ N. lat., about 10 miles from the mouth. Steamers can ply along the Commewyne and Cottica, and, during the rainy season, along the Courmotibo, but the Wane Creek is only navigable by canoes, being in some places only 10 or 12 feet broad, and in the hot season it is partially dried up. A traveller by this route avoids the sea voyage from Paramaribo to the mouth of the Maroni and the dangers of the entrance, but he has many difficulties to encounter on the way, and has still to ascend the more arduous part of the Maroni. A third way is by a footpath traced out in 1876 to reach the gold mines. It is 50 miles long, and starting from Broko Pondo on the Upper Surinam, in lat. 5° 3′ N., strikes the Maroni above the dangerous falls of Pedrosungu, in lat. 4° 35′ 26·7″ N. It is now seldom used, and is in many parts so overgrown with vegetation as to be untraceable. It is evident that none of these routes is adapted for the transport of goods, and therefore Captain Zimmermann proposes the construction of a steam tram, which should ascend the Surinam from Paramaribo for a distance of about 50 miles, and then strike across the country in a south-westerly direction to the confluence of the Lawa (Fr. Aoua) and Tapanahoni. The total distance would be only 115 miles, and the gold-fields would be reached in eight or ten hours, whereas at present the journey occupies about fourteen days. As mentioned in vol. iv. p. 644, the upper part of Guiana is exceeding rich in various kinds of timber as well as in gold, and its exploitation ought to amply repay the cost of establishing adequate means of transport. It is also necessary that the Dutch Government should have easy access to the gold district, in order to maintain order among the adventurers of all nations who have been attracted thither, and to settle any complications that may arise in connection with the concessions granted by the French Government. Along the Surinam also a tramway ought to be extremely beneficial in affording an easier outlet to the produce of the plantations. The present state of Dutch Guiana, however, does not warrant any great expectations of its future. In the *Bull. de la Soc. R. Belge de Géographie*, No. 6, 1891, an astonishing list is given of the products of the country, especially of timber, resins, and gums. Yet the author affirms that the commerce is languishing. This is partly due to fiscal and other regulations, but in great measure, no

doubt, to the climate, in which no European can do hard work. On the abolition of slavery many planters suffered severely from want of labourers, and the Government saved the colony from total ruin only by obtaining permission from the British Government to import coolies from India. Of late years the Dutch have been trying to obtain labour from their own East Indian possessions.

Bitumen in Venezuela.—M. Fortin has communicated to the Paris Geographical Society (*Compte Rendu*, No. 4, 1892) a discovery of a bituminous plain in the Gulf of Paria. At the bottom of the gulf, opposite the village of Guariqueñ, lies what is erroneously called the *island* de la Bréa. It is separated from the mainland, not by a channel, but by a tract of low ground where small lagoons are formed in the rainy season. The plain of bitumen, covering an area of about 7000 acres, is formed by petroleum, which, issuing from numerous vents, spreads itself over the surface in thin layers, and by oxidisation is gradually converted into the variety of bitumen known as glance-pitch.

Peru.—A correspondent, writing to our Hon. Treasurer, expresses his opinion that Peru must look for any real development to the eastern slope of the Cordilleras. The narrow slip of land along the Pacific coast produces the best sugar in the world. But labour is dear and inefficient. The Indians are dying out, and Chinese and coolie labour, which alone could replace native labour, is not at present available. Nor could the water supply be much increased, at any rate not without enormous expense. Again, the mines, all of which lie on the high and desolate plateaus of the Andes, do not promise to regain their former reputation. They are difficult to work, and transport is very costly. On the other hand, magnificent country stretches along the eastern slope of the Andes, descending to the headwaters of the Amazons. Water is abundant, and the climate is healthy and sufficiently temperate to allow Europeans to do field-work. Through communication will soon be established with this region. The last ridge is now being perforated by a tunnel three-quarters of a mile long, and the railway from Lima, which now terminates at Chicla, will in June be completed to Oroya. The Chanchamayo line will be opened soon after.

The Races of Tierra del Fuego.—The ethnography and ethnology of this archipelago is the subject of the seventh volume of the reports on the French Expedition which, in 1882, observed the Transit of Venus. The Onas inhabit the eastern part of the main island ; the Alakaluf dwell on the smaller islands on the north-western side of the Archipelago ; and the Yaghans, allied physically and anthropologically to the Alakaluf, are found among the southern islands. They are far more numerous than the other tribes, and, as the French station was established in their district, the anthropological observations principally relate to them. The average height of the men is 5 ft. 2 in., and of the women 4 ft. 10 in. The skull is large, comparatively high, and of medium breadth. The face is long and angular, with a narrow, low, and receding forehead. The eyes are small and brown in colour, the nose concave with wide nostrils, the mouth broad and the lips thick, and the cheek bones prominent. The upper extremities are proportionally long, and the lower short. The hair is black, straight, and stiff. The skin is yellow, brownish or reddish. The Yaghans are decidedly different in type from the neighbouring South American races, and resemble in their corporal peculiarities certain scattered tribes of the centre and north of South America—the Guarani, Coroado, the Aimara of Peru, and, above all, the Botocudo. They are probably remnants of an early sub-brachycephalous race who were scattered by the invasion of the later brachycephalous tribes.—*Globus*, No. 13.

AUSTRALASIA.

The Elder Expedition.—On p. 48 of this volume the route of this expedition was traced to Esperance Bay. At the beginning of November the party started northwards again across the Fraser Range and Mount Mongar (31° 5′ S. lat. and 121° 36′ E. long.). This country is covered with *mallee* (*Eucalyptus dumosa*), acacia brushwood, and saltbush (*Atriplex vesicaria*). The soil is not bad, but was dried up by the excessive heat, and was quite destitute of water. Mr. Lindsay was therefore obliged to diverge towards the west, following the route of Mr. Hunt in 1864. At length he reached the Yilgarn District, and found sufficient water at Karoling, about thirty miles south of Southern Cross. When the camels had rested, it was intended to move on towards the Murchison river, but a later despatch states that almost all the members of the expedition had given in their resignations, and that Mr. Lindsay would therefore return to Adelaide. A letter from Herr Streich, the geologist of the expedition, describes the sufferings of the party during the march across the Great Victorian Desert. Queen Victoria Spring is nothing more than a soakage, and was dried up when the party reached it.—*Petermann's Mitt.*, No. 2, 1892.

Silver Mines in Tasmania.—Silver has been discovered in the neighbourhood of Mount Zeehaan, and 80,000 acres of ground have been leased out by the Government for mining purposes. Argentiferous rock extends northwards to Pieman River, and late explorations have led to discovery of deposits still further north. Within the last two years a new town, named Zeehaan, has sprung up, and now contains three thousand inhabitants. The cost of transport, which is a serious obstacle to the success of these mines, will shortly be diminished by the opening of a railway, 29 miles long, to the nearest port, Strahan on Macquarie Harbour.—*Revue Française et Exploration*, January 15th, 1892.

The Tongariro Mountains, New Zealand.—Last year Mr. Cussen, a Government surveyor, made a survey of these mountains, a report of which forms Appendix No. 3 of the *Report of the Survey Department for the year* 1890-91. The crater of Ngauruhoe, the Red crater, and Te Mari, which are still active, together with the Blue Lake crater, the Nga-Puna-a-Tama crater, and the warm crater lake on the summit of Ruapehu, lie on a line bearing 36° 30′ east of north, which, if prolonged northwards, will be found to pass through the Whakarewarewa springs and along the eastern side of Rotorua. Seen from the west Tongariro has the appearance of a single green cone, nearly three miles wide along the top, with the tall symmetrical cone of Ngauruhoe rising just beyond its southern rim to a height of 7515 feet. On the eastern side appear three great rents, separated by great ridges of rock in some places as much as 800 feet high, from which issue the Mangahouhounui, Oturere, and Waihohonu streams. The lower slopes of the mountain are composed of lava streams, between which, on the west, the head-waters of the Whanganui River take their rise. These slopes are clothed with tussock grass, blue grass, flax, and ferns, and are excellent pasture for sheep. The summit is formed of extinct cones, the highest of which has an elevation of 6100 feet. Another contains a lake of the most beautiful blue tint. The Red Crater, which still emits steam impregnated with acid and sulphur fumes, lies on the south-eastern side at a height of 6050 feet, while on the northern slope, 5000 feet above the sea level, are situated the two craters of Te Mari. From the upper of these flowed the most recent lava-stream to be found on the mountain. It extends northwards for a distance of three miles, and is probably fully fifty feet thick at one mile from the crater. On the north side of Tongariro, at a height of 4800 feet, are some thermal springs, said

to possess powerful medical properties. The rocks found on the mountain are rhyolite, augite, and andesite, the last forming the most recent discharges.

GENERAL.

Currents of the North Atlantic.—The Prince of Monaco has presented to the Society a map showing the results of his experiments. The general direction of these currents was given in vol. v. p. 444. The mean velocities are as follows: between the Azores, Ireland, and Norway, 3·97 miles per hour; between the Azores, France, Portugal, and the Canaries, 5·18 miles; from the Canaries to the Antilles, the Bahamas, and the Bermudas, 10·11; and in the eastern part of the arc between the Azores and Bermudas, 6·42 miles. The western part of the oceanic vortex moves, therefore, faster than the eastern, which may be explained by the co-operation of the forces due to trade-winds, fusion with the Equatorial Current and Gulf Stream, and the great evaporation in tropical regions.

Greatest Depths of Oceans and Seas.—*Petermann's Mitt.*, Bd. 38, No. 2, contains the following list of the deepest soundings at present obtained and their positions:—

	Lat.	Long.	Depth in fathoms.
N. Atlantic Ocean,	19° 39′ N.	66° 26′ W.	4560
S. Atlantic, Ocean,	0° 11′ S.	18° 15′ W.	4029
North Sea (Skagerack), ca.	58° 12′ N.	9° 30′ E.	442
Baltic Sea, ca.	58° 37′ N.	18° 30′ E.	233
Mediterranean Sea,	35° 45′ N.	21° 46′ E.	2405
Black Sea, ca.	42° 55′ N.	33° 18′ E.	1431
Caribbean Sea, ca.	19° 0′ N.	81° 10′ W.	3427
Indian Ocean,	11° 22′ S.	116° 50′ E.	3393
N. Pacific Ocean,	44° 55′ N.	152° 26′ E.	4655
S. Pacific Ocean,	17° 4′ S.	172° 14′ W.	4529
Bering Sea,	54° 30′ N.	175° 32′ W.	2146
Sea of Japan, ca.	38° 30′ N.	135° 0′ E.	1640
China Sea, ca.	17° 15′ N.	118° 50′ E.	2350
Sulu Sea,	8° 32′ N.	121° 55′ E.	2549
Celebes Sea,	4° 16′ N.	124° 2′ E.	2794
Banda Sea,	5° 24′ S.	130° 37′ E.	2799
Flores Sea,	7° 43 S.	120° 26′ E.	2799
Arctic Ocean,	78° 5′ N.	2° 30′ W.	2469
Antarctic Ocean,	62° 26′ S.	95° 44′ E.	1975

Are the Winters in the North becoming milder?—Professor Voeikof has discussed this question in the *Meteorologische Zeitschrift*, September 1891. He alludes to Glaisher's observations in England, which answer the question in the affirmative. In North and Central Russia also it is the general opinion of the people that the weather in winter is less severe than formerly. On the other hand, colder winters have been experienced in the Caucasus and Turkistan. The dates of the freezing and thawing of the Hudson River show that this alteration is not local, but that in the zone a little north of 40° there has been an increase of cold weather. Observations of temperature, taken at St. Petersburg from 1744 to 1890, prove that the number of cold days on that latitude have diminished considerably, and that low temperatures have been less common during the period 1828 to 1890 than previously. Indeed, in the latter half of this century their annual number has been only half what it was at the end of last century and the beginning of the present.—*Globus*, Bd. lx., No. 23.

Coal in Spitzbergen.—Herr Leo Cremer made a journey to these islands during the summer of 1891. On the east coast of Bear Island he found six coal-seams, in some places as much as five feet thick, and belonging to the true coal formation. Bel Sound, Ice Fiord, and King's Bay were also visited, and everywhere fragments of coal were found in the beds of streams and on the hill-slopes. At Cape Heer (Ice Fiord) a seam several feet thick was discovered, and in King's Bay coal *in situ* was also observed.

MISCELLANEOUS.

The total **Indian Population of Canada** is 121,638.—*Colonies and India*, March 12.

Dr. Brandel of Greifswald and Herr O. Baschin of Berlin will make observations of the **Aurora** during the coming winter at Bossekop, in Lapland.—*Deutsche Rundschau*, Jahr. xiv. Heft 6.

Neptunia, Jan. 1892, contains a map showing the distribution of **Plankton**, in the North Atlantic, as far as it was ascertained by the expedition of the Humboldt-Stiftung. In an accompanying paper Herr F. Schütt discusses the results of the expedition.

A pamphlet by Mr. William J. Thomson has been published by the Smithsonian Institution, giving a full and very interesting account of **Easter Island**, its volcanoes, inhabitants, buildings, statues, inscriptions, etc. All the subjects are elucidated by numerous illustrations.

M. Dybowski has arrived in the country where M. Crampel was assassinated. M. Nebout, who commanded M. Crampel's rearguard, gives the particulars of the disaster in a report published in the *Bull. du Comité de l'Afrique Française*, March 1892. M. de Brazza was at Jembé, on the Sanga, on Jan. 2d.

The **Population of India** is larger than was expected before the results of the census were fully ascertained. It proves to be 287,289,783. There are 75 towns with a population exceeding 50,000, of which 29 have a population of more than 100,000, and 6 of more than 200,000.—*The Colonies and India*, March 26th.

An expedition is to be sent out by the Imperial Russian Geographical Society to **Sze Chuen** and the adjacent districts of Tibet. Under the leadership of M. Potanin it will undertake geographical, geological, ethnographical, zoological, botanical, and astronomical investigations.—*Deutsche Rundschau*, Jahr. xiv. Heft 7.

In a reprint from the *Proc. of the U. S. National Museum* Dr. R. W. Shufeldt has collected all that is at present known about the **Havesu-pai Indians**, a small tribe, fast approaching extinction, who dwell in the cañon of the Cataract Creek, a small tributary of the Colorado. In summer they live in the hollows of the rocks, and in winter build themselves huts of saplings.

In his report the Imperial Commissioner, Von François, states that 622 white men and 116,000 natives live in **German South-West Africa**. Europeans enjoy excellent health. The trade passes through Walvisch Bay, and in 1890 the value of the imports was £23,685, and of the exports £5750. The latter consist principally of ostrich feathers, gum-arabic, hides, horns, and a small quantity of ivory.

The sixth session of the **Summer School of Art and Science**, under the direction of Professor Geddes, will be held in August next. Courses of lectures will be delivered on Education, Social Science and Humanities, Natural Science and Art. Professor Geddes will be assisted by Professor Haddon (Dublin), Mr. R. G. Moulton (Camb.), Dr. Berry Haycraft, and Messrs. J. A. Thomson, N. Wyld, R. Turnbull, A. J. Herbertson, and others.

Telegraphic communication having been established with **Fort Salisbury**, in Mashonaland, Mr. Duncan, the British South Africa Company's surveyor, has determined by telegram the longitude of that post. He gives it as 31° 4′ E. The latitude is given by Ellerton Fry as 17° 54′, and by Swan as 17° 49′ 30″ S., the difference being probably due to the observers' positions. For the present the mean, 17° 51′ 45″, may be employed.

Since 1883 the Dutch Government has been carrying out a **triangulation of Western Sumatra**, and at the end of 1890 the net-work had been extended over an area of more than 10,000 square miles, while some points had been determined in the northern part of the Padang lowlands and the south of Tapanuli. The base-line extends from Gunung Gadut to Pulau Satu, and is about 112,504 feet, but, owing to a probable error of more than $3\frac{1}{4}$ feet, it must be measured again.—*Tijdschrift van het Kon. Neder. Aardrijkskundig Genoot.*, Decl. xi. No. 1.

The last (January) number of the *Calcutta Review* (a work but little known in England) contains an able review of **Central Asian Exploration** in past centuries, chiefly from Greek, Chinese, Arabic, and Russian authorities. The article bears internal indication of having been written some little time ago, but this, of course, does not of itself detract from the merits of the compilation, which has been put together with considerable skill, and will be found useful to geographical students, in spite of the indifferent editing, which has disguised many of the proper names almost beyond hope of recognition. The author's name is concealed under the initials "C. J."

Two handbooks of professional instructions for the trigonometrical and topographical branches of the **Indian Survey** Department have just been issued from the office of the former at Dehra Dun, in the North-West Provinces. They have been prepared by Colonel G. Strahan, R.E., under the direction of Colonel H. R. Thuillier, R.E., the Surveyor-General, and will prove most useful to the numerous officers of that department, as well as to students and others in this country who contemplate joining the service. Some of the miscellaneous chapters, such as those on the care and treatment of elephants and on the health and management of a party, will be found to have a good deal of interest for the general reader, while the more purely technical parts contain full and instructive information as to the important and miscellaneous scientific tasks which fall to the lot of the Indian surveyor.

NEW BOOKS.

Place-Names of Scotland. By James B. Johnston, B.D., Minister of the Free Church, Falkirk. Edinburgh: David Douglas, 1892. Pp. xcix. + 256. *Price 7s. 6d.*

This volume contains introductory chapters on Celtic, Norse, English, Roman, and Ecclesiastical Names, in 99 pages separately numbered, and 256 pages of an Alphabetical List of place-names, with short remarks on their derivations, analogies, etc. The introductory chapters bristle with names and information that the student would willingly consult in detail, but unfortunately there is no *Index*, though this might readily have been supplied by references in the following *List* to the pages of the introduction. This is done in a very few instances, but they do not help much to supply the want.

The *List* contains close upon 3200 names arranged alphabetically. Names we should expect are wanting ; others, of less interest perhaps, are included. It contains about 500 fewer names than Sir H. Maxwell's *Topography of Galloway* (noticed vol. iii. p. 547), which will best indicate that the work contains only a small selection from the place-names of Scotland. It is much fuller, however, than Robertson's *Gaelic Topography of Scotland*, which contains under 1700 names : and let us hope it is more reliable.

One excellent feature in Mr. Johnston's work is the old spellings with the dates of the documents from which they are taken ; one could have wished the author, like Sir H. Maxwell, had also added the name of each authority. The old forms are most important for the student in tracing back names to their originals, and he should know where they are to be found ; *e.g.* the author gives (p. 5) *Abbordoboir* as the old spelling in the *Book of Deer* for Aberdour ; Dr. Skene, from the same source, gives *Abber-doboir* : which has made the slip here, the reference enables us to determine.

But as the science of place-names takes form, outgrowing and discarding all conjectures, and searching out and arranging the facts that alone can build up its structure, it will be found that the dates when the present forms of names first gained currency will be of special importance. Many of them belong to a very recent date—to the age of the newspaper reporter and "Post Office Guides" ; these have unwittingly assumed authority in a matter they had little knowledge of. Dr. Skene, in 1865, wrote *Kirkintulloch*, as if no other form were then authorised, and tells us that Nennius calls it *Cærpentaloch* ; Mr. Johnston writes *Kirkintilloch* with the forms it had *cir.* 1200 and 1288, but without any hint that his spelling is at all of late date. In the case of *Newbattle*, the information that in 1825 it was still *Newbottle* is more instructive.

Mr. Johnston anticipates objection to the large use he makes of conjecture, and defends it on the ground that it is unavoidable from the circumstances of the case and that his conjectures are all "within the bounds of scientific sobriety." We need not seriously quarrel with such a position ; it is honest compared with the unwarranted assertions of predecessors in the same field : the mischief is that the conjectures are apt to be quoted without the author's "perhaps." Perhaps names of doubtful origin might best be left without any derivation until the true one is discovered.

It is not easy to estimate the value of a work of this kind : it contains very many facts, besides the dates of old forms, that are most important, and the collection of them is deserving of all praise. If we try the book *ad aperturum*, however, we may find instances of names that have not been satisfactorily sifted. For example, we have (p. 10) :—

> "Amisfield (Dumfries and Haddington). Dumfries A., *a.* 1175, Hempisfield looks as if from Dan. *hemp*, Icel. *hampr*, hemp. But the Haddington name is probably from the personal name *Ames*."

Hempsfiell or *Amisfeeld* is the entry made in Blaeu (1604), but the two names are not necessarily connected. "Amisfield Tower" is well known, and the foundations of the old castle (finally demolished about 60 years ago) can still be traced. The Charteris family, feudal barons of Amisfield, were of local note in the times of the Stuarts, and tradition assigned the present name of the estate to Amyas de Charteris, to whom it was granted at a much *later* date than 1175. Investigation might settle this.

Annan and *Annandale* (p. 11) are treated as if they had no connection, whereas dale and town both take name from the river ; but how its name can possibly be connected with G. *ceanann*, "whiteheaded, bald," is difficult to conjecture. Under

Almond (p. 9), we learn that in 1640 it was written *Amond*: so Dr. Skene wrote it not thirty years ago, and says that in the *Pictish Chronicle* it is *Aman*; and there we also find *Inveraman*.

Finhaven Mr. Johnston first traces (p. 111) to G. *fionn abhuinn*, "clear, white river"; and later (p. 256) "probably G. *fodha n'abhuinn*, 'below the river,'" but Dr. Skene makes it *Fothen-evin*, the first part being the same root (*fothir* or *fothuir*, "land") as in Fordun, Forteviot, Fetteresso (*Fothuiresach*), etc.

Lamlash contains the G. root *lann*, Wel. *llan*, which the author says is rare in Scotch names, citing *Lhanbryde* (Moray) and Longforgan. He might have added Lantrethan, Longnewton, Longniddrie, etc.; the Latin equivalent *Planum*, contracted into *pan*, is also found in Panmure and Panbride, for both of which he has given (p. 196) rather fanciful derivations, viz., the latter from G. *ban* or *pan* (prefix), "female," "she," *i.e.* she-Bridget; and "Panmure, probably G. *bàn*, *bàine*, 'white, waste' + O.E. and Icel. *mór*, Sc. *muir*, 'white or waste moor.'" Mere conjectures like these should not be ventured.

In *Cat(t)erline*, *Colli(e)ston*, *C(o)ulter*, *C(o)uper*, *Dun(n)ottar*, *Dur(r)isdeer*, etc., we find letters enclosed in parentheses without explanation. *Cladich* (p. 64) is spelt *Claddich* on the Survey Map, but that is perhaps an error; *Conisby* (p. 70) is so spelt on the map, but often elsewhere as *Conispy*.

With some faults, which lie on the surface and tempt correction, we recommend the volume and hope the author will be encouraged to revise it, and greatly to augment his materials for a more extended work. Names are so often first applied on account of striking characteristics that the features of the place will often control the meaning of the name. Hence it is much easier to work with some feeling of accuracy on the place-names of a single district than on those of a whole country. Books like Sir H. Maxwell's on Galloway and Mr. Macdonald's on Strathbogie must be multiplied before we can look for a general work that will be wholly satisfactory.

Across Thibet, being a Translation of "De Paris au Tonkin à travers le Tibet inconnu." By Gabriel Bonvalot. With Illustrations and Map. Translated by C. B. Pitman. London, Paris, and Melbourne: Cassell & Co., 1891. Two volumes. Pp. xii. and 218, and viii. and 230. *Price* 32*s*.

It is to be regretted that a narrative of exceptional interest should have been committed to a translator who seems unacquainted either with the literature or with ordinary matters bearing on the subject, and not very familiar with the differences between French and English idioms. The omission from the translation of the scientific appendix is also to be regretted. From a topographical point of view the description of the scenery along the entire route through Tibet is valuable, as giving a singularly clear idea of the character of the country; after crossing the range of the Altyn Tagh, a short distance to the south of Lob Nor, the traveller enters on the great Tibetan plateau, itself at a great elevation, bare and desolate, and swept by howling wind-storms driving the great masses of sand and gravel which grind down the rocks and incessantly change the face of the country. Vegetation seems hardly to exist, although herds of wild animals are seen. The plateau is intersected by range after range, which the traveller crosses by lofty passes. The sufferings caused by the rarefied atmosphere and cold combined were greater, we think, than they have been found to be by other travellers; but the reality of the privation encountered is shown by the deaths, very pathetically described, of two of the explorer's most trusty followers.

The description of Lob Nor, where a short halt was made, is very interesting; it does not indeed add anything to the more complete description of Prjevalski

written thirteen years earlier, but it seems to confirm the reports of the gradual desiccation of the district. The difference between the present condition of things and that which Prjevalski found may perhaps be less than M. Bonvalot thinks; the difference of season must have some effect, and the small upper lake, Kara Buran, was then, as now, the principal sheet of water. It would seem that the supply of water fluctuates. It was reported by Prjevalski to have been increasing for some years previous to his visit, and these fluctuations must depend on other causes than the amount drawn from the river Tarim for irrigation. Still, there is no doubt that, even though the Tarim never flowed into the Whang Ho, the whole region was within comparatively recent times in a very different condition, as testified not only by the tradition of a vast lake and a numerous population, but by the remains of ruined cities. Its strange, isolated, dwindling population is a curious study; perhaps, however, in the economy of nature its chief actual importance is as a halting place for the immense flocks of birds which migrate annually south and north across a vast, arid, and otherwise unbroken expanse.

We should like to know where the "seal-skins" come from, said to be paid by the Lob Nor people as tribute. Surely no seals are found nearer than Lake Baikal?

The writer describes a curious phenomenon met with on the Tibetan plateau. In the neighbourhood of certain hot springs he observed several cones of ice, partly mixed or coated with gravel. These appear to have been formed by hot springs which gradually lost their power and subsided. They recall an assemblage of cones of similar formation, but consisting of a calcareous deposit, raised by hot springs at Hammam Meskutin in Algeria, where the water, unable to rise higher, has gradually receded and broken out elsewhere. The Tibetan, like the Algerian cones, are occasionally split vertically from above.

Readers of M. Bonvalot's account of his Pamir journey will find in the present volume a series of pictures to the full as vivid; graphic details of the day's march, and of the evening encampment; of the nature of the country, the wild animals and strange human figures encountered, and of the sterling qualities of his native followers. As to his European companions, Prince Henry of Orleans and the Belgian Father Dedeken, we only hear incidentally of the cheery, gallant French spirit in which, like their leader, they face and make the best of their difficulties and hardships. As on the former journey, where the difficulties are of man's opposing, diplomacy is replaced by very summary and high-handed proceedings, which seem, at least, to have the justification of success.

On arriving at the great lake Tengri Nor or Namtso, however, the party was met by a deputation in force from Lhassa. We do not gather that any attempt or request was made to be allowed to enter the sacred city. Possibly it did not enter within the travellers' plans; at all events it would not have been conceded. But the demand to be allowed to proceed *via* Batang into China, although M. Bonvalot would have us understand that it was only granted owing to very vigorous diplomacy, seems to have been complied with in the most generous and friendly spirit, an escort and all the needful provisions and carriage being supplied liberally and gratuitously.

Their whole intercourse, indeed, with the people of Tibet, excepting some of the rude mountain tribes, was marked by great friendliness. Though horribly dirty, the Tibetans are pronounced to be less so than the Chinese; the description of their conventional signs of respect, friendship, approval and disapproval, is very amusing.

The writer dwells with justifiable pride on the large share which Frenchmen have had in the exploration of Eastern Tibet, from the times of Huc and Gabet,

down to Desgodins and the present time; he found a party of French missionaries at Tatsien-lu, where he rested for a month before proceeding through Yunnan to Ton-king. Ethnologists will have their own opinion as to his verdict on the Tibetans as a race. He declares them to be white, with, frequently, faces of a Greek or Italian type, and to have nothing in common with the yellow races excepting the absence of hair on the face. His somewhat wholesale condemnation of the Chinese, again, must only be taken as the impression of a passing traveller.

We should have been glad if the narrative of the latter, *i.e.* Chinese, stages of the journey had been somewhat fuller. Geographically, however, the whole narrative is of decidedly more value than the author's former work, which, as to the physical description of the country traversed, was somewhat disappointing—(Mr. Pitman, by the way, imagines the Pamir journey to have been 'unprecedented'). For the illustrations we have nothing but praise. The map, owing chiefly to its scale, is much less satisfactory—at all events the publishers might in addition have given the much fuller route map which appears in the *Bulletin* of the Paris Geographical Soc., 3e Trim. 1891.

The Government of Dependencies. By Sir G. C. Lewis, K.C.B. Edited, with an Introduction, by C. P. Lucas, B.A. Oxford: Clarendon Press, 1891. Pp. lxviii. + 392. *Price* 14*s.*

The Government of Victoria (Australia). By Edward Jenks, M.A., Professor and Dean of the Faculty of Law in the University of Melbourne. London: Macmillan and Co., 1891. Pp. xliii + 403. *Price* 14*s.*

The *Government of Dependencies*, published in 1841, embodies, says Mr. Lucas, "a mass of historical information and political wisdom put together in the clearest, simplest, and most impartial form by a man who was at once a practical statesman and a political philosopher." It deserves, he thinks, to be a text-book in the history and philosophy schools at the universities, and will repay the study of all who are interested in the great questions of British imperial concern. We may ourselves add that those of our readers who have followed intelligently the articles in this magazine on Britannic Confederation can turn to few better works for the discussion of many difficult problems than to Lewis' *Government of Dependencies*, thus supplemented and brought down to date by Mr. Lucas in a lucid and painstaking introduction and in appropriate foot-notes.

Lewis' work is well known to most political students. Its author, erudite and resourceful, acquired during his lifetime the reputation of being a "sagacious dictionary:" and this fairly expresses the character of what he writes; it is perhaps also the reason why he did not anticipate more exactly the actual course of events. He was too learned and too logical for the world of politics, which is full of compromises and even haphazard arrangements. In the very year in which Lewis' work appeared Canada was striking out for herself a course which has led to results such as he never anticipated. And here arises a question which Mr. Lucas aptly puts and ably discusses: Are the great British Colonies "dependencies" in the true sense? "If," said Lewis, "the government of the dominant country substantially govern the dependency, the representative body (in the dependency) cannot substantially govern it: and, conversely, if the dependency be substantially governed by the representative body, it cannot be substantially governed by the government of the dominant country. A self-governing dependency (supposing the dependency not to be virtually independent) is a contradiction in terms." Clearly, therefore, those colonies which are known officially as possessing both representative institutions and responsible government are not

dependencies. As an illustration of Lewis' exhaustive treatment of subjects (in this work he does not err so conspicuously in laboured and disproportionate treatment as in others), we may mention, without quoting, his summary of the advantages and the disadvantages resulting to the dominant state and to the "dependency," respectively, from their mutual connection: all of which are ably expounded and commented on by Mr. Lucas.

At the end of a valuable introduction Mr. Lucas raises the familiar question, how best to maintain the connection between the mother-country and the colonies. With an eye to British and foreign colonial history, he is careful to express the opinion that the soundest policy is to "leave events to shape themselves:" let Great Britain be just, duly considerate and sympathetic towards subject and colonist, and she has done her best, her all, to retain her empire. But that is perhaps too general; Mr. Lucas accordingly refers with guarded approval to the most generally mooted of the schemes proposed, Imperial Federation. To secure this, hurry must be shunned, lest the existing slender tie be snapped, and also because science is daily bringing the countries concerned nearer each other, and Colonial Confederation should first be worked out. Moreover, there are difficulties, commercial, fiscal, and governmental: "Imperial Federation is at present little more than a dream"—a statement which Mr. Lucas fortifies by reminding his readers that British Federation cannot be complete without including the greatest of British Colonies, the United States. Mr. Lucas by his former writing had proved his competence to edit this work, and we congratulate him and the Clarendon Press on the striking evidence of his success.

No stronger indication of the disparity in the conditions existing to-day and fifty years ago could be desired than is furnished in Professor Jenks' work, *The Government of Victoria*. In 1842, by the constitution of that year, representative government was introduced into Australia; in 1851 (ten years after the appearance of Sir G. C. Lewis' treatise) Victoria formally separated from New South Wales; the same year witnessed the discovery of gold in Victoria; in 1852 the Supreme Court of Victoria was created, and in 1855 responsible government (which takes Victoria out of the category of Lewis' "dependencies") was granted; next year the ballot was adopted in parliamentary elections—sixteen years earlier than in England; in 1857 manhood suffrage was established for elections to the Assembly, and the property qualification of members was abolished (a year prior to its abolition in England); and in 1870 the practice of payment of members was initiated. It would be difficult to overrate the value of Professor Jenks' book as a sound contribution to the history of colonial constitutional development. It is a most careful piece of work, and Mr. Jenks has had the advantage of compiling it on the spot during his professorship at Melbourne, where he succeeded the late Dr. W. E. Hearn—a position which he has since felt himself constrained to resign. Mr. Jenks, viewing his subject with a prudent comprehensiveness which some of our constitutional writers have yet to follow, traces economic and social progress in the light which it throws on his more immediate task, and sometimes quite independently of it. His work, in fact, contains almost all that is worth knowing concerning the development of Victoria before and since its separation. Much of it lies beyond the scope of these pages. The author seems to us especially successful where he touches on the relations between home and colonial constitutional development; we would point particularly to his remarks on the cabinet system in Victoria. Incidentally a clear light is thrown on our own constitutional theory and practice in England: thus (pp. 313-317) we have a very able conspectus of the legal position of the executive. The style bears traces here and there of the hurry with which the work has been composed under the exigencies of lecturing on the subject: in this respect,

indeed, the book falls short of the author's Cambridge prize-essay on the *Constitutional Experiments of the Commonwealth*. We hope that Mr. Jenks will have leisure to produce a work, much needed in England at present, on comparative constitutional law and government in England and the Colonies.

An Inquiry into the Ethnography of Afghanistan. By H. W. Bellew, C.S.I., Surgeon-General, Bengal Army (retired). Woking : The Oriental University Institute, 1891.

Dr. Bellew has for some years been known as one of the best authorities on Asiatic ethnology ; and the work before us, in which he publishes his observations on the historical antecedents and the racial affinities and peculiarities of the tribes of Afghanistan, is a contribution of exceptional value to this branch of investigation. The treatise has been compiled from a great mass of miscellaneous notes and memoranda and unrecorded reminiscences of a variety of information acquired by the author while he resided on the borders of Afghanistan, and during excurtions which he made from time to time into the interior of the country. It was hastily prepared as a monograph for the International Congress of Orientalists which was lately held in London, and we cannot say it is by any means free from defects incidental to the rapidity with which it was composed.

For the purpose of his inquiry Dr. Bellew takes Afghanistan to extend from the Arabian Sea in the south to the river Oxus, as far as Khojah Saleh, in the north, and from the Persian frontiers in the west to the river Indus in the east as far north as Gilgit. Afghanistan so defined includes both Baluchistan and the province of Baktria, and represents very nearly what was in ancient times called Ariana. According to Ptolemy this extensive region was divided into seven provinces : Margiana (*Merv*), Baktriana (*Balkh and Badakshân*), Paropamisus (*the country between the Hindu-Kush and the Indus*), Drangiana (*Sistan and Kandahar*), Arakhosia (*Ghazni and Suleimân range*), and Gadrosia (*Baluchistan*). The divisions of the country, as spoken of by the Mohammedan writers, are not so well defined. Some speak of the northern half as Kabulistan, and the southern as Zabulistan ; of the north-eastern part as Bakhtar, and the north-western as Ghor ; of the south-eastern part as Roh, and the south-western as Nimroz. The name of Afghanistan is not applied to their country by the inhabitants themselves either in whole or in part, but this is done only by their neighbours and by foreigners. The Afghans have no doubt been known in history as a distinct people since the early part of the eighth century of our era, but the *country* was not called Afghanistan until the middle of last century, when its inhabitants became an independent nation under a king of their own. On this subject Dr. Bellew says that he has met with no tribe, nor clan, nor section named Afghan, or bearing a name anything like it. The source of the name he finds in the Armenian word *Aghvân* (pronounced Alwân), which means a *mountaineer*, and is not an ethnic term, but merely the appellation of the inhabitants of a mountain region. But may not the name after all be indigenous, preserving that of the *Assacani*, an important tribe settled to the north of the Kabul river, which offered a gallant but ineffectual resistance to the arms of Alexander ? Their name means "cavalier," being derived from the Sanskrit, *asva*, or *asvaka*, "a horse," and shows that their country must have been noted in ancient times, as it is at the present day, for its superior breed of horses.

The method which Dr. Bellew follows in conducting his inquiry appears to us to be the best he could have selected. He bases the exposition of his views on the description given by Herodotus of the twenty satrapies of which the great Persian

empire, founded by Cyrus, was composed. From this authentic record he ascertains the names of the races by which Ariana was peopled at the time when history first brings them into notice. He then supplements this information with a variety of more specific details gathered from the works of later classical authors, such as Strabo, Pliny, Arrian, Ptolemy, and Q. Curtius, who wrote after Alexander's Asiatic expedition had brought the Eastern world as far as the Jaxartes, the Indus, and the Sutlej under the immediate cognisance of the nations of the West. He then presses into his service the works of modern writers, and specifies Tod's *Annals of Rajasthân* as that which he had found most useful for his purpose when seeking to determine what Afghan tribes or clans were of Indian origin. He finally utilises all the information collected from these sources by taking it in combination with the results of his own personal observations while he resided near or among the people themselves.

His analysis of the composition of the Afghan tribes is most searching and elaborate, and must form the groundwork of all future investigations in the same direction. The analysis shows that the tribes are of very varied descent. Their country, from its geographical position, which makes it the great highway to India, has been frequently invaded, and each invasion has introduced some new element into the population. This fact is brought to light all through the *Inquiry*. When each tribe is analysed into its component clans and sections, it is found that the names of these in many instances correspond more or less closely with names current among the races by which the country was successively subjugated, such as Greeks, Indians, Scythians, Goths, Moguls, Arabs, Persians, and others. The Mohammedan conquest of the country, which led the people generally to adopt Islam, has tended to disguise in some measure their racial affinities, since not a few of the clans were persuaded to abandon their own proper names and to assume instead others which were more in harmony with their new faith. Dr. Bellew, notwithstanding all the changes thus, or otherwise, produced, has been able to distinguish between the descendants of the old possessors and those of the later settlers. He has been able also to identify from their names many of the existing tribes as representatives of the nations which Herodotus and other ancient writers have mentioned as occupying Ariana. Some of these tribes he found retaining not only the names but the very seats which their ancestors occupied of old. These identifications may be accepted without much demur, but there are certain others he proposes which cannot but be rejected unless supported by stronger proofs than he adduces. We refer to his identifications of certain clans and sections of Afghan tribes as the descendants, partly of those disabled Greeks soldiers whom Alexander planted as colonists in various parts of the country, and partly of other Greeks, both European and Asiatic, who afterwards became settlers under the rule of the Græco-Baktrian kings. The similarities he detects in the names we cannot but think to be illusory, and we know not what to make of his astounding assertion that the vocabulary of the language these tribes at this day speak as their vernacular is to the extent of one-half—more rather than less—either unaltered Greek or Greek changed so little as to be easily recognisable. Can it be possible, if this were a fact, that it could have escaped all cognisance till now? Lord Elphinstone, we know, during his Kabul embassy, caused inquiry to be made on this very point in Kafiristan, where it was alleged some tribes were to be found that could claim a Greek descent. The language of those tribes was therefore closely examined, but no Greek element could be detected in any of their dialects. We find, besides, that Dr. Trumpp, a profound Pushtu scholar, who within the last few years published a grammar of the language, does not so much as mention Greek in his preface, though he there shows with what dialects Pushtu has more or

less of affinity. One or two, however, of the identifications proposed by Dr. Bellew in this connection appear to be entitled to acceptance, as his finding in the Baraki tribe of Afghanistan the representatives of those captive Greeks who were transported by Darius Hystaspes from the Libyan Barkê (in the district of Kyrênê) to the Baktrian satrapy. He assumes too much, however, in saying that their true origin was known to the followers of Alexander. The passage he cites from Arrian in proof has no real bearing on the point. The story of the Branchidai, who were transported by Xerxes from the neighbourhood of Miletus to Sogdiana, is well known. Dr. Bellew identifies as their descendants a tribe settled in the Inderab district, called the Barangi, and here he may again be right. But what is to be thought of his tracing some ethnic affinity between the Malli (the people of Multan in old times) and the Milesians on no better ground than some likeness in their names not much greater than that between Monmouth and Macedon?

He devotes some interesting paragraphs to an examination of the accounts given by Alexander's historians of the famous campaign in which he advanced from the Hindu-Kush to the Indus, reducing on his way all the fierce and warlike tribes which occupied the regions situated to the north of the Kabul river. These regions are extremely rugged and mountainous, and are even to this day very imperfectly known. Hence the great conqueror's movements are more difficult to follow in this than in any other of his campaigns, and the tribes and places through which he passed have, therefore, in only a few instances been satisfactorily identified. We do not think Dr. Bellew has here cleared up any points that have hitherto been in dispute; but his account of the tribes which occupied the theatre of war, and his lists of the names of the clans and sections of which they were composed, will be of the greatest possible use to future investigators. We must point out, however, a singular mistake into which he has here fallen. Through his having carelessly read, or somehow misunderstood, a passage in Strabo, he has been led to believe that, besides the Taxila which lay to the east of the Indus, there existed another, which lay to the west of it, and he has identified the position of this imaginary city with that which is now occupied by the Tâkhâl villages near the Peshawur cantonments. He, moreover, identifies the *Thyraioi* with a tribe in the Kot-rud valley, called the Tirâhi; but the *Thyraioi* never existed any more than the "Kime," which the Rev. Sydney Smith has made immortal. The *Thyraioi* have disappeared from all the editions of Arrian since Gronovius showed the name to be a misreading for that of the *Gouraioi*, a people whose descendants are probably now to be found among the Ghor tribes. These mistakes appear to us, however, to be more excusable than the uniformity with which the Greek designation of the fish-eating tribes of the Makran coast is misspelt in the treatise, which speaks of them as the *Ikhthiophagoi*. But, after all, the blemishes we have pointed out, and some others which want of space has precluded us from noticing, detract but little from the substantial merits of the work, which embodies a vast amount of needful information that no one but the author could have supplied.

Rulers of India: Earl Canning. By Sir H. S. Cunningham, K.C.I.E. With a Map. Oxford: Clarendon Press, 1891. Pp. 220. *Price* 2*s.* 6*d.*

This volume worthily maintains the standard of a good series. Canning, appointed Governor-General of India in 1855, became its first Viceroy on the transference of the government from the Company to the Queen. Mutiny, then, and reconstruction are Sir H. S. Cunningham's two great themes. What is written is well written, but we think more might have been said of Canning's own share in the work, and less, especially, of the general course of the mutiny (as in

chapters iii. and iv.), which has already been treated in this series of volumes. Still, as the author puts it, in periods like that of the mutiny prominent men "lead only a public existence." The chapter on Canning's assailants is one of the most interesting, the most important, and, from the nature of the subject, the most debateable in the book. In it (p. 160) we have a clear view of Canning, the man and the Governor-General, in such words as these from his reply to Lord Ellenborough: "No taunts or sarcasms, come from what quarter they may, will turn me from the path which I believe to be that of my public duty." Sir H. S. Cunningham finds in Canning's bearing at this crisis qualities that were characteristic—"thoroughness in preparation, wisdom in action, and magnanimity under undeserved attack." The policy of reconstruction in general is ably presented; the judicial reforms of 1860-61 might, however, have been more fully expounded.

Rulers of India: Madhava Rao Sindhia, otherwise called Madhoji. By H. G. Keene, C.I.E., M.A. Oxford: At the Clarendon Press, 1891. Pp. 207. *Price* 2*s.* 6*d.*

Madhoji certainly deserves a place in a series devoted to the Rulers of India, and the task of relating the events in which he took a prominent part, and of portraying his character as a man and as a political leader, has appropriately been assigned to the writer, who, by his work on the *Fall of the Mogul Empire*, has given proof of his fitness to describe and appreciate the complicated movements that in the eighteenth century brought about a complete revolution in the political condition of India. No historian can have a more difficult and less inviting task than he who undertakes to tell the history of the century from the death of Aurungzeb, which saw the gradual breaking up and final fall of the Great Mogul Empire. It demands patient study and keen insight to apprehend the causes of internal decay, to discriminate the different competitors who aimed at supplanting the royal power, or strove for a share in the great inheritance, to pick out the salient and important events, and to discover and bring out clearly why the long confused struggle ended in what was virtually the Hindu re-conquest of India—a re-conquest which was, however, of short duration, and only cleared the ground for the establishment of the British Power. Mr. Keene has shown himself equal to this difficult task. Though somewhat hampered by the limited space at his disposal, he has made the story of the rise and victorious progress of the Mahratta Power both intelligible and interesting. He has thrown light on the decay of the Mogul Empire by emphasising in particular the interruption to the steady immigration of energetic adventurers from the more temperate northern regions, which during previous centuries had powerfully contributed to the maintenance of Mohammedan supremacy, and has made it intelligible why it was with none of the warlike Hindu races of Upper India or Rajputana that victory finally rested, but with a comparatively small and obscure tribe seated on the southern frontier of the Empire. Mr. Keene, however, appears to most advantage in graphic description and judgment of character. By a few touches he makes the prominent leaders in the long struggle to live in his pages, while he judges them with fairness, absence of exaggeration, and sympathetic appreciation. Sindhia's own career, which is his main subject, is so described that the reader feels he knows the man, with his great powers and all his thoroughly Oriental traits of character. Mr. Keene's gift of literary expression proves, however, sometimes a snare to him. His sketch, in the introduction, of the leading geographical divisions of India would have been more effective and intelligible to the ordinary English

reader if he had expressed himself with more simplicity and directness. Literary adornment of style, or looseness of phrase, which interferes with clearness, is misplaced, and this was an occasion for practising self-restraint.

My Second Journey through Equatorial Africa. By Hermann von Wissmann. Translated from the German by Minna J. A. Bergmann. Map and 92 illustrations. London: Chatto and Windus, 1891. Pp. 326.

This is an account of Major Wissmann's journey in the years 1886 and 1887 from the Congo to the Zambezi. It is for the most part taken from his diaries, and records the incidents of caravan-life. No attempt has been made to dwell on geographical aspects; except for a chapter, in the Appendix, on the Bashilange, we learn very little of the tribes with whom Major Wissmann came in contact: but he has purposely withheld, until a more convenient occasion, anything on purely scientific subjects that he may have to add to the remarks in his previous work, *Im Innern Afrikas*, which covered much the same ground. It is to him and his compatriots, Pogge, Wolf, and others, we owe our chief knowledge of the magnificent system of waterways comprising the Kasai river-basin. Apropos of this, Major Wissmann claims, and with justice, that the main artery should be exclusively called the Kasai, and not the Sankuru at one part of its course.

One important feature of this work is the information it affords as regards the ravages of the slave-trade to the west of Tabora, Ujiji, and Nyangwé,—the chief collecting-centres for the Eastern Traffic. At the time when Wissmann was passing through, Tippu Tib's lieutenants were ravaging the country in all directions. Immense areas, previously known to Wissmann as fertile and supporting a dense population, had been laid waste. Tippu Tib's attack on the Stanley Falls station had already taken place when Wissmann reached Nyangwé, though this "uncrowned Sultan of Central Africa" was himself at Zanzibar. Tippu Tib's son was left behind to "do the honours," and, it must be confessed, he showed himself very hostile to Europeans: it is to be hoped, for the peace of Central Africa, that he may not be in a position to command the same resources on his father's death.

The translation is an indifferent performance. It is to be regretted that important geographical works like this, and many other recent books we might mention, should not have had the advantage of an expert's revision on their translation into a foreign tongue.

Seven years in the Soudan: being a Record of Explorations, Adventures, and Campaigns against the Arab Slave Hunters. By Romolo Gessi Pasha. Collected and edited by his son Felix Gessi. Illustrated. London: Sampson Low, Marston and Company, 1892. Pp. xxiv + 457. *Price* 18*s.*

Those who would know what the African slave-trade was, and is, will do well to read this collection of letters written by Gessi Pasha. It explains much that is obscure in regard to Central African affairs and the origin of Mahdiism. It is painful reading nevertheless, for it describes in detail the heroic sufferings of Gessi and his companions in their successful efforts to abolish the traffic in human flesh. It is all the more painful because one realises so acutely that all the suffering and all the loss of life have been apparently in vain, for one knows that the abandonment of Khartum and the needless destruction of Egyptian supremacy in the Sudan have served to restore once more the prestige of the slave-dealers, and to rekindle the fires of adversity which torture the unhappy inhabitants of what was, when Gessi left it, a fertile and peaceful province.

To those who knew Gessi personally the volume is of intense interest, as each

page bears the impress of the restless energy of a man intolerant of restraint, a good leader of men, a commander of considerable ability, full of resources under difficulties, and with an eye to commerce.

It may be well to give a very brief outline of Gessi's life. He was born at Constantinople in 1831, and entered the office of Mr. Lloyd, the British Consul at Bukharest, in 1848, where he remained until the Crimean war, at the outbreak of which he obtained the office of interpreter to General Strnowhys. During this period he made the acquaintance of General Gordon. In 1873 he followed Gordon to Egypt, and was employed during the next few years in transport service, in conveying two steamers to the Albert Lake, and in exploring its waters. Returning to Europe, he, together with Dr. T. Matteucci, organised an expedition to Fadasi with the object of releasing Captain Cecchi. This expedition, owing to a fire and other circumstances, was not destined to be accomplished. It arrived as far as Khartum just when the news of the revolt of the slave-dealers in the Bahr-el-Ghazal had reached there ; and Gordon appointed Gessi to go and put down the revolt. The greater part of this volume is an account of his campaign against Suleiman, son of Zebehr Pasha and chief of the slave-dealers in the Bahr-el-Ghazal district. The struggle was carried on with great bitterness on both sides ; in fact, it was a war of extermination ; no quarter was given, and Suleiman with fifty-two of his chiefs out of fifty-three perished fighting. Having put down the rebellion and cleared the country of the slave-dealers, Gessi set to work to organise the province. In this he was successful, and an immense quantity of ivory and indiarubber was exported to Khartum, a service of boats being established on all the larger tributaries of the Bahr-el-Ghazal.

In September 1880, when Gessi was recalled to Khartum, the steamer on which he made the voyage was caught in the grass that so often blocks the Nile, and the travellers were imprisoned until the 5th of January 1881, amidst scenes of unparalleled misery. 430 of the company died, many having given way to cannibalism. During this time Gessi was brought to the brink of the grave ; such, however, was his vitality that he was able to survive the transport to Suez, where, after receiving the thanks of the Khedive in person, he died on the 30th of May 1881—a tragic ending to a chequered career.

The volume, which has been edited by Gessi Pasha's son, is well illustrated, and to all who would understand the Sudan Question it is an indispensable contribution to its history.

The Commerce of Nations. By C. F. Bastable, LL.D., Professor of Political Economy in the University of Dublin, Examiner in Political Economy in the University of London, etc., etc. London : Methuen and Co., 1892. (Social Questions of To-day Series.) Pp. viii. + 216. *Price* 2*s.* 6*d.*

There are many persons, it is to be opined, who still believe that Free Trade was virtually unknown before the days of Cobden and Bright, and that the abolition of the Corn Law monopolies was but the first step towards a system which is now looked upon as practically unchangeable. But the fact is, the English Parliament passed many Free Trade measures several years before the Corn Law Agitation. Nor does the other clause of the general belief, that regarding the unalterableness of Free Trade, rest on any more unchallengeable foundation. For at the present moment one of the most noticeable signs of the times is a strong reversion to the policy of Protection in most of the leading countries on the Continent, and there are men even in our own island who have not scrupled to lift up their voice on behalf of, at all events, a modified form of Protection. Professor

Bastable has undertaken in the present book to state the history of the struggle between the great rival commercial policies, as well as to set forth the arguments that are, or can be, put forward in support of each. We have read the book with real enjoyment, due to its lucidity of style and clear and logical thinking. The writer is firmly convinced that Free Trade is better than Protection, nay, better than any form of retaliation or reciprocity, which, as he says, are Protection in disguise. And of the truth of this proposition he is convinced by reason and the irrefutable logic of economic facts and laws. The case for Protection is stated with the most open candour, and in the fairest possible way; but, all the same, the author ably meets every argument that its advocates have alleged on its behalf with arguments yet more convincing. And Professor Bastable has the full courage of his convictions; for he does not hesitate to maintain that the Free Trade policy of England, as against the Protectionist measures of nearly all the world beside, is well justified by its consequences,—the commercial, social, and political advantages that necessarily accrue from its working. The reader will find in this little book a very clear exposition of all the points at issue, and will not fail to agree in two of the chief lessons that are to be drawn from the discussion, (1) that Protection "would appear to be nothing but the old mercantile and pre-mercantile methods continued in modern times under a new name;" and (2) that the strongest motive for sticking to a policy of Protection is that it affords a very convenient means of raising revenue indirectly, that commends itself both to rulers and to those they govern. For this as well as for another cogent reason —that the system of Protection agrees so aptly with the predominant sentiments of nationality—it is not at all likely that Free Trade will be adopted generally by the nations of the world for many years to come. We can commend this work to such as desire to learn the *true* bearings of the controversy between Protection and Free Trade, and to understand the real import and consequences of the questions at issue.

Boundaries of Counties and Parishes in Scotland as settled by the Boundary Commissioners under the Local Government (Scotland) Act, 1889. By HAY SHENNAN, Advocate, formerly Secretary to the Commissioners. Edinburgh: Wm. Green & Sons, 1892. Pp. 397.

This important semi-official work is, says its author, "essentially a book of reference." The precise changes effected in each county and parish by the Boundary Commissioners may be ascertained by the aid of cross references. Mr. Hay Shennan rightly, however, concludes that the work of the Boundary Commissioners will not be complete until it is illustrated by maps which can be readily consulted by the public. "It would be greatly for the public advantage," he says, "if two complete sets of one-inch Ordnance maps (and six-inch maps, where the changes are minute) were placed in some public office, one set coloured to show the boundaries of counties and parishes as they were prior to the work of the Boundary Commissioners, and the other set coloured to show the new boundaries." A general map shewing the chief changes in the boundaries might have been expected in such a work as this.

The Riviera. By HUGH MACMILLAN, D.D., LL.D., etc., etc. New and revised edition. Illustrated. London: J. S. Virtue and Co., Limited, 1892. Pp. xvi + 304.

This is not a guide-book like Murray's or Baedeker's. It does not profess to give information on the modes of travel or living, but concerns itself chiefly with the features of the country, the characteristics of the people, the towns, villages, castles

and monasteries, and their historical associations. The possession of a book like this adds much to the pleasure of a residence in one or other of the health resorts on the Riviera, as it points out the objects of interest in the neighbourhood which are easily reached, and gives details of their history, romantic or otherwise, interspersed with many a legend and old-world story. Even those who are well acquainted with the Riviera will find much that is new to them, as Dr. Macmillan has obtained access to sources of information unknown to most writers. The book is profusely illustrated. Most of the pictures are excellent, and represent many beautiful points of view, calculated to encourage the visitor to go and see for himself what is there depicted. We have no doubt that this edition of *The Riviera* will have as wide a circulation as the last.

Montrose. By Mowbray Morris. 'English Men of Action.' London: Macmillan & Co. 1892. Pp. vi. + 229. *Price* 2*s.* 6*d.*

A fascinating literary style and a singular power in the dissection of character combine to make Mr. Morris' work a very welcome contribution to this popular series. It is well done almost all through; but we are of opinion that a little original research into the events connected with Lord Aboyne's campaign might have thrown some new light on the conduct of that important, though unfortunate, undertaking, and have relieved the monotony of that part of the narrative. The author has followed, although not slavishly, the great work of Napier, which must ever remain the standard authority on the career and life of Montrose; and to those who have been unable to consult these volumes of biography the present well-written and temperate history of a great life and of a stirring time ought to be specially useful.

Leaders into Unknown Lands: Being Chapters of Recent Travel. By Arthur Montefiore, F.G.S., F.R.G.S. London: S. W. Partridge and Co., n.d. Pp. 320.

There cannot be much doubt that popular compilations, such as the present, have a considerable amount of success; otherwise they would not issue in such abundance from the press. Admitted that they serve to supply a want, it must be said that Mr. Montefiore has done his work well, and produced a volume of excellent sketches for those who, from one cause or another, do not wish to consult original authorities. It will make an admirable gift-book for young people, and should be read with interest by boys. Livingstone, Burton, Stuart, Wallace, Stanley, and Nansen are the leaders whose journeys and adventures are related. The volume is copiously illustrated and brightly bound.

Aarbog for Dansk Kulturhistorie, 1892. Udgiven af Poul Bjerge. Kjöbenhavn: i Kommission hos Lehmann and Stage, 1892. Pp. 223. *Price* 2 *kronor.*

The second volume of this interesting annual publication maintains the same level of excellence that was attained by its predecessor. The longest paper, by Poul Hansen, is almost equal in dramatic interest to H. Nutzhorn's of last year; it relates the incidents attendant upon a somewhat autocratic landowner's endeavours to introduce agricultural and economic reforms amongst his peasants. There are three other papers, one on "Burials Alive," by H. F. Feilberg, which is full of interest for students of folk-lore; another, by C. Nyrop, on the guild life of Denmark in the middle ages; and some recollections of Copenhagen seventy

years ago. The book deserves a longer notice, but such would be out of place in this *Magazine*, none of the papers being geographical.

The Life and Voyages of Christopher Columbus. By WASHINGTON IRVING. London, Edinburgh, and New York : T. Nelson and Sons, 1892. Pp. 293. *Price* 2*s.*

Messrs. Nelson have produced a very attractive edition of Washington Irving's well-known work. The print is clear and not too small, and the binding is neat and tasteful.

This World of Ours: An Introduction to the Study of Geography. By H. O. ARNOLD-FORSTER. Cassell & Company, 1891. Pp. 312. *Price* 3*s.* 6*d.*

No introduction to geography so simple, clear, and stimulating as this little volume has hitherto come under our notice. It reflects brightly the movement for elevating geographical teaching, and reflects it primarily from Mr. Ravenstein's paper in 1885 on *Aims and Methods of Geographical Education.* Mr. Arnold-Forster has designed the book to arouse interest rather than to supply information. Hence he has been able to develop the instances he adduces so as to make each thoroughly comprehensible, and his compilation is not embarrassed by the attempt —necessarily vain within such narrow limits—to cover the ground completely. Most of the examples selected to illustrate geographical principles are fresh and practical ; the numerous woodcuts are original and often very effective.

The scope of the book may be indicated as an outline of the physical sciences underlying geography, and of the departments of geography which spring from that basis. After sampling physical geography the chapters deal in turn with historical, political, military, commercial, and statistical geography. It appears to us that the connection between these and the fundamental physical geography might have been more clearly shown. This might have been done, and the book would have been made more complete by a short chapter on anthropology or, at least, ethnography. On the whole the author has been judicious in his omissions, but we think the prevailing winds of the globe should have received fuller treatment, since they, more than ocean currents, dominate climate.

We have some fault to find with the definitions, or "explanation of terms" as they are called. To define the earth's axis as "the line connecting the two poles" is a case of the cart before the horse. "A small telescope, called a *theodolite*" suggests that it is by the telescope rather than by the mounting of it that angles are measured. A meaningless newspaper phrase creeps in here and there ; for example, "the vast continent of India." On p. 82 we read concerning a map on the scale 1: 63,360, "The real piece of land is 63,360 times the size of the representation on the sheet of paper." This is an obvious slip for "any distance measured on the real piece of land is 63,360 times the length, etc." But such slips do not occur often.

One characteristic of the book will enhance its value at the place of publication, but seriously detract from it elsewhere. This is, that it is written "in and for" London, and exhibits in several places marks of the curious provincialism of the metropolis. We hardly think Cumberland people will acknowledge (p. 243) that they "talk a language which is very nearly akin to pure Danish," and Mr. Arnold-Forster himself supplies abundant incidental proof in his fascinating pages that it is not the case "that no Londoner has an idea of what the ice and snow of the Crimea are really like" (p. 149).

Das Luftmeer. Die Grundzüge der Meteorologie und Klimatologie nach den neuesten Forschungen. Von Professor Dr. Friedrich Umlauft. Wien—Pest—Leipzig: A. Hartleben's Verlag, 1891. Pp. 488. 15 maps and over 150 illustrations.

Three quarters of the book are devoted to the principles of meteorology, and one quarter deals with their application in climatology, the whole being treated in a popular but accurate way. It is unfortunate, however, that the author is not more familiar with the recent results of Buchan and Aitken, and particularly that he fails to insist on the importance of dust as an agent in almost all atmospheric changes. Nor is there an adequate account of recent results in high-level meteorology. In spite of these drawbacks Dr. Umlauft's exposition should prove of use in German-speaking countries. The maps are clear and well executed, and the numerous illustrations—many of them, by the way, have already done service in Flammarion's *L'Atmosphère*—add greatly to the attractiveness of the book.

Natal. The Land and its Story; A Geography and History for the use of Schools (with map). By Robert Russell. Pietermaritzburg: P. Davis and Sons, 1891. Pp. 266.

Mr. Russell has accomplished his work well, and the children of Natal are fortunate in having such a history and geography. The book meets all the requirements of the most advanced educational geographers. It seizes on essential and fundamental facts which serve to connect and explain the subsequent description; and the geographical part bears witness to the author's observational, as well as to his literary, power. The history is told with spirit-stirring force, and cannot fail to sink deeply into the mind of the learner. Enthusiasm such as Mr. Russell exhibits is not uncommon amongst colonial writers, but it is very uncommon to find it associated, as is here the case, with an impartial estimate of events on which a resident in Natal must have difficulty in thinking coolly.

The book is written for children resident in Natal by the Superintendent of Schools for the Colony, and on this account it is more trustworthy than most colonial geographies. It is written with adequate knowledge and an absence of any emigrant-catching or investment-provoking motive, and on this account, as well as for its scientific and literary merit, it ought to be widely read in this country.

Murray's Handbook for France. Parts I. and II. Eighteenth Edition. London: John Murray, 1892. Pp. (63) + 433 and (32) + 425. *Price 7s. 6d. each.*

As this hand-book is now in its eighteenth edition, and as the greatest care has invariably been bestowed upon it, it is not surprising that it has attained the highest rank as a guide. Part I. contains the western half of France, and Part II. the eastern, the country being divided by an imaginary line running nearly north and south through Paris. Nothing seems wanting, so far as maps and plans of towns are concerned, whilst the descriptions of localities are at once interesting and concise. We observe that Strassburg and Metz are still included in Part II., although no longer French towns, which may be flattering to French sentiment, but is not geographically accurate. Pains have been taken to describe and map the battles around Metz and Sedan. The maps throughout are by Messrs. Weller, and are clear and ample for tourist purposes.

Handbook for Travellers in Syria and Palestine. An entirely new edition, with Maps and Plans. London: John Murray, 1892. *Price 18s.*

This new edition of Murray's *Syria and Palestine* is practically a new book.

The greater part of it has been re-written, though a good many passages of the old handbook, written by the Rev. J. L. Porter, have been retained in their original form. The editing of the present edition has been intrusted to Mr. Haskett Smith, author of an article, in *Murray's Magazine* for September 1891, on the Site of Calvary. In order to obtain space for the additions rendered necessary by recent explorations, without increasing the size of the book, the editor has omitted the portion relating to the Wilderness of Sinai, as that region is generally visited from Suez and Lower Egypt, and not from Syria. A distinct improvement has been made in the itinerary lists by giving the distances in miles, as well as in hours and minutes. The editor claims to have identified for the first time no fewer than fifteen ancient Biblical and Classic sites, and he explains fully in each case the grounds on which the identification rests. The editor adopts Major C. R. Conder's view that the true site of Calvary is to be found in *El Heidhemîyeh*, a rocky knoll outside of the south gate of Jerusalem, above the so-called "Grotto of Jeremiah." In an article in *Good Words* for April 1892 Major Conder complains that his idea has been adopted, without acknowledgment, by the late Lawrence Oliphant, and by the Rev. Haskett Smith in his article in *Murray's Magazine*. Neither is the source acknowledged in the *Handbook*. Of the work generally it may be said that it possesses all the valuable features that characterise the series to which it belongs, namely, accuracy, fulness of information, clearness of expression, and conciseness of description, with a wholesome avoidance of fine writing in praise of scenery. The maps and plans include four large maps by Edward Weller, namely, of Southern Palestine, Northern Palestine, Jerusalem and suburbs, and Northern Syria; and twenty-five ground-plans of churches, mosques, and other buildings. All these are executed with great care. The geographical and historical introduction and the chapter of general information will be of great value to travellers, and contain, besides, much that is interesting to readers at home. The Guide Book proper is arranged in fifty-one distinct routes, under each of which the necessary information is given in the most convenient and accessible form.

King's Handbook of the United States. Planned and edited by Moses King. Text by M. F. Sweetser. London: Osgood, M'Ilvaine and Co., n.d. Pp. 940. 51 maps, 2639 illustrations. *Price* 10*s.* 6*d.*

The low price and exceptional richness in illustration of this handsome volume suggest that it might be a battery of masked advertisements; but a careful examination convinces us that this is not the case. It is a unique work giving concise descriptions, and statistics of the 1890 census, of every state and territory in the Union. The maps, although unpretentious, are clear, and the miniature pictures often convey graphically more than the letter-press they displace could have expressed in words. Not a millimètre of space is wasted, and the editorship leaves nothing to be desired.

Itinerary through Corsica. With 5 Maps and 1 Plan. By C. B. Black. Third Edition. London: Adam and Charles Black, 1892. Pp. vii. + 56. *Price* 1*s.* 6*d.*

This is a new and enlarged edition of Mr. Black's excellent Guide to Corsica. He states that the easiest way of reaching the island is "by the large weekly Tunis steamer of the Compagnie Générale Transatlantique," which, on its way from and to Marseilles, touches at Ajaccio (211 miles) and makes the passage in 16 to 19 hours.

Western Australian Year-Book for 1890. (Fifth Year of Issue.) By Malcolm A. C. Fraser, Registrar General. Perth. By Authority: Richard Pether, 1891. Pp. 127.

Possessing less importance than most of its sister colonies, Western Australia has, notwithstanding, its own modest record of progress, and this record Mr. Fraser has presented in admirable order in the pages under review. Perhaps the best way of indicating the contents of the *Year-Book* is to quote some of the interesting statistics furnished by the author. For instance, we note that the population has steadily, if slowly, increased from the year 1870, when it was returned at 24,785, up to 1890, when the figures stood at 46,290. The only year showing a decline was 1888, when there was a decrease of 351 on the returns of 1887. In 1890—to turn to the health of the colony—the causes of death were: 12·78 per cent. from zymotic diseases; from constitutional diseases, 14·45 per cent.; from local diseases, 41·11 per cent.; from developmental diseases, 17·22; from violence, 7·96 per cent.; and from ill-defined causes, 6·48 per cent. The number of deaths per thousand in 1889 was 14·19—larger than that in the other Australian colonies, with the exception of Victoria (17·56) and Queensland (15·44). For the ten years 1880-89 the mean was 16·73—larger than the mean for the other divisions, except Queensland (17·00). With the increase of the population, however, it is satisfactory to notice that the rate per thousand has steadily declined. Regarding railways, 204 miles of Government and 385 miles of privately owned lines are open for traffic, and 354 miles have been surveyed for new communications, which are being proceeded with. These brief notes are, we believe, sufficient to show the interest this publication is sure to possess for any one connected with Australia, or interested in her progress and advance.

A Handbook of British Commerce: being a descriptive and statistical account of the various articles forming the import and export trade of the United Kingdom. By P. L. Simmonds, F.L.S. London: Moffatt and Paige, 1892. Pp. viii + 204. *Price* 3*s.* 6*d.*

Such a work as this must be not only useful to the merchant, but also interesting to all readers of books of travel and other geographical literature, who, no doubt, are often curious about the nature of many articles they find mentioned. Mr. Simmonds deserves great credit for having published the first book of the kind, if one or two insignificant pamphlets be passed over. He has collected a great deal of information regarding the varieties and origin of the multifarious articles of trade, and statistics of imports and exports. There is room, however, for a few emendations when a second edition is issued. Mere definitions of common English words, such as bags, sheets, blotting-paper, etc., should be omitted; those who do not know that mutton is "the flesh of the adult sheep," will find that information in an ordinary dictionary. Nor should we consult such a book for the English of *duvet*, *amidon*, etc. On the other hand, if *cédrat* and *pompelmos* are used in commerce, it should be stated that the former is merely the French for citron and the latter a corruption of *pamplemousse*. Again, we find the local terms *camote* and *paddy*, but not *sirih* and *taro*; these latter plants, as well as a few others, should not appear in a book dealing with *British* commerce. The superiority of the so-called Spanish mahogany over the timber brought from Honduras should be alluded to; palisander should be noticed as allied to rosewood; and the eared-seals, caught chiefly in Alaska and yielding the best fur, should find a place under "seal-skins." We find partridges and turkeys, but not pheasants or grouse; Brie and Gruyère cheese, but not Gorgonzola and Roquefort; porpoise-skins and ox-hides, but not quagga. In the first attempt at a new kind of compilation, however, there is much excuse for such omissions and inconsistencies.

NEW MAPS.

EUROPE.

SCOTLAND. New Reduced Ordnance Survey Map of the counties of Lanark, Renfrew, Ayr, Stirling, Dumbarton, etc. By John Bartholomew, F.R.G.S. Scale 1:126,720, or 2 miles to 1 inch. *Price* 5*s*.

Reduced Ordnance Survey Map of the Lothians and Fife, with parts of their adjacent Counties. By John Bartholomew, F.R.G.S. Scale 1:126,720, or 2 miles to 1 inch. *John Bartholomew and Co., Park Road, Edinburgh.*

These two maps give effect to the recent alterations of County and Parish boundaries, as laid down by the Boundary Commissioners in the districts round Glasgow and Edinburgh. It might have been an advantage if the author had not only shown the new boundaries, but had also marked, by a special colour, those territories which have been transferred from one County or Parish to another. All railways, roads and footpaths, hamlets, mansion-houses, woods, antiquities, etc. are clearly indicated and brought up to date. These Reduced Survey Maps of Messrs. Bartholomew are in every respect admirable productions.

ENGLAND und FRANKREICH, Die Bevölkerungs—Verschiebung in ——. Von Alexander Supan. I. England, 1880-91, auf Grund der Registration Sub-Districts. Scale 1:1,500,000. II. Frankreich, 1881-86-91 auf Grund der Departements und Städte über 30,000 Einwohner. III. Frankreich, 1881-86. IV. Südöstliches Frankreich, 1881-86.

Petermann's Geographische Mitteilungen, Jahrgang 1892, *Tafel* 6. *Gotha: Justus Perthes.*

SARDEGNA, Carta Generale della ——. Con speciale indicazione delle reti stradali e delle nuove circoscrizioni amministrative ed ellettorali disegnata e pubblicata dall' Istituto Cartografico Italiano. Scala 1 : 500,000.

Roma: Istituto Cartografico Italiano.

This is an entirely new general map of Sardinia, reduced from the Italian Survey and constructed on the same scale as the map of Sicily, published by the same Institute, which we favourably noticed in the January number of the *Magazine*. The map, though without hill-shading, will be useful to tourists. All railways, tramways, and roads are clearly shown.

SIENA, Carta Stradale ed Industriale della Provincia di ——. Scala 1 : 500,000.

GROSSETO, Carta Stradale ed Industriale della Provincia di ——. Scala 1 : 500,000.

NAPOLI, Carta Stradale ed Industriale della Provincia di ——. Scala 1 : 500,000. *Roma: Istituto Cartografico Italiano.*

ASIA.

UPPER IRAWADY REGION, Map of the ——. Drawn by Major J. R. Hobday to illustrate Lieutenant Eliott's Reports on the Frontier Expedition. 1890-91. 2 sheets. Scale 1 : 506,880 or 8 miles to 1 inch.

Proceedings of the Royal Geographical Society, March 1892.

NORTHERN KOREA. Scale 1 : 2,914,560 or 46 miles to 1 inch. To illustrate Mr. Campbell's Route.

Proceedings of the Royal Geographical Society, March 1892.

CENTRAL-ASIEN, Übersichtskarte von K. J. Bogdanowitsch's Reiseroute in ——, in den Jahren 1889 und 1890. Massstab 1 : 7,500,000.

Petermann's Geographische Mitteilungen, Jahrgang, 1892, *Tafel* 5.
Gotha : Justus Perthes.

THE ADAI KHOKH GROUP in the Central Caucasus, from the New Russian Surveys and Signor V. Sella's and Mr. H. W. Holder's Photographs and Notes. Scale 1 : 126,720, or 2 miles to 1 inch.

Proceedings of the Royal Geographical Society, February 1892.

CENTRAL AMERICA.

COSTA RICA, Karte der Berggruppen Buena Vista und Chirripó, sowie der anliegenden Thäler auf dem süd-westlichen Abhang der Republik ——. Entworfen von Prof. H. Pittier. Massstab 1 : 500,000.

Petermann's Geographische Mitteilungen, 1892, *Tafel* 1.
Gotha : Justus Perthes.

THE WORLD.

ERDE, Die Kulturformen der ——. Von Dr. Ed. Hahn.

Petermann's Geographische Mitteilungen, 1892, *Tafel* 2.
Gotha : Justus Perthes.

TIEFENFORSCHUNGEN in den Jahren 1888 bis 1890. Von Prof. Dr. A. Supan. Nebenkarten : Profil der Lotungen zwischen Fidschi- und Tonga-Inseln.—Tiefenkarte des Pazifischen Ozeans zwischen Neuguinea und Samoa-Inseln.—Tiefenkarte des Meerbusens von Bengalen.

Petermann's Geographische Mitteilungen, 1892, *Tafel* 4.
Gotha : Justus Perthes.

ATLAS.

PHYSICAL GEOGRAPHY, Atlas of ——. Illustrating in a series of original designs the elementary facts of Cartography, Geology, Topography, Hydrology, Meteorology, and Natural History. New and enlarged edition. 1892. *Price* 12*s.* 6*d.* *W. & A. K. Johnston : Edinburgh and London.*

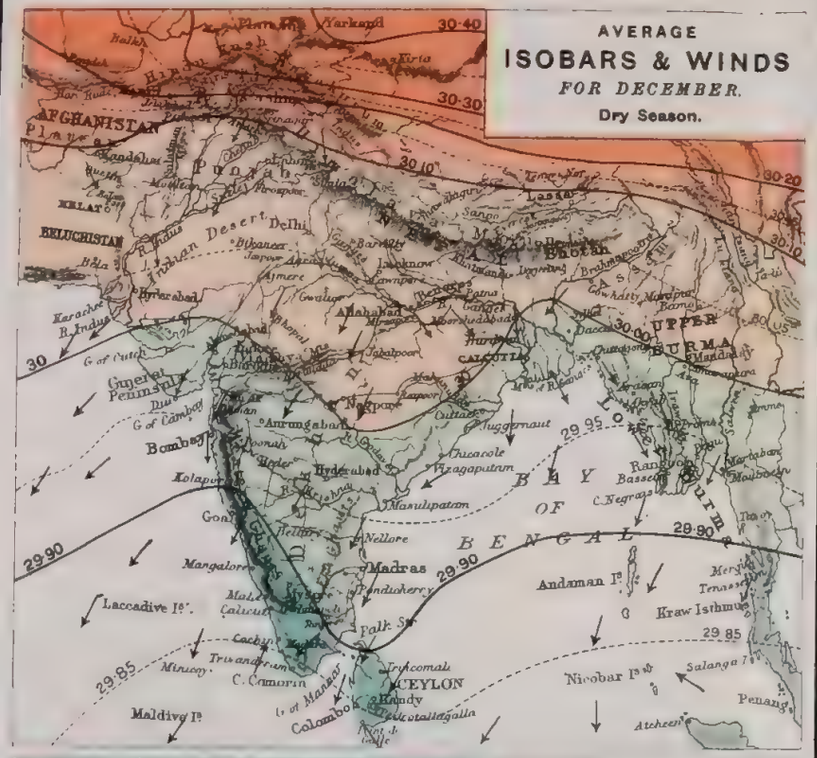
This is a new and enlarged edition of the late A. K. Johnston's *Atlas of Physical Geography.* All the maps have been carefully revised and brought up to date. Nine of the 24 plates comprising the atlas are entirely new. There are three good geological maps of the British Isles, Europe, and North America. Instead of North America, a general geological map of the world would have better met the requirements of students. The maps devoted to meteorology are reduced from Dr. Buchan's original compilations, and are very well drawn. Two maps of the world, showing ocean-currents and heights of land, and depths of the oceans, are also new additions. The latter gives only one contour-line—that of 5000 feet—above the sea-level. This is scarcely satisfactory, since it does not sufficiently bring out the general relief of the land. Another contour of, say, 500 feet, might have been introduced with advantage. Sir Archibald Geikie, Director-General of the Geological Survey, has supervised the correction of the plates of Geology, Topography, Hydrology, and Meteorology. This atlas may be thoroughly recommended for use in schools and in the study.

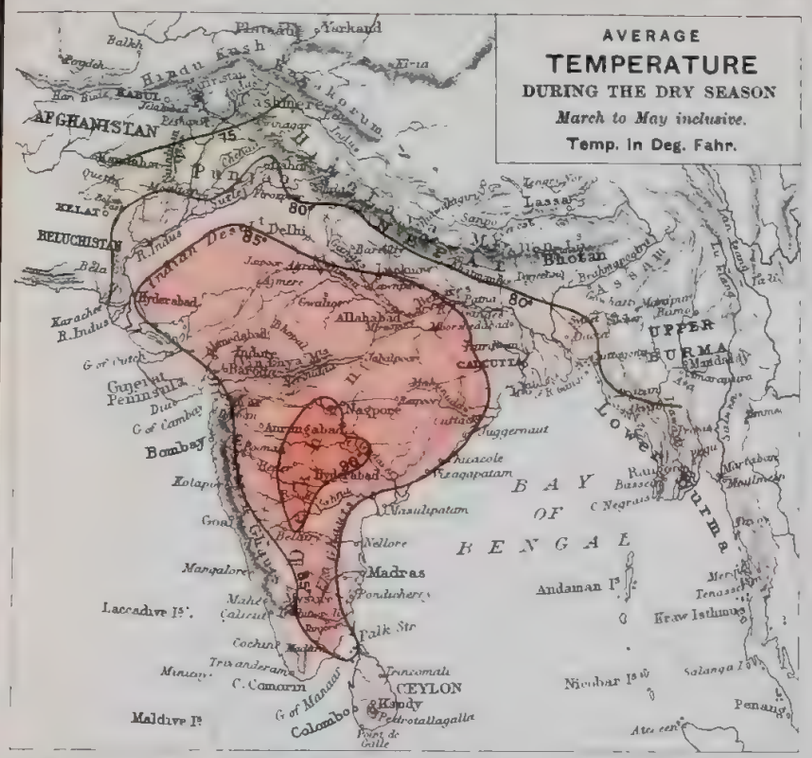
METEOROLOGICAL SKETCH-MAPS OF INDIA.

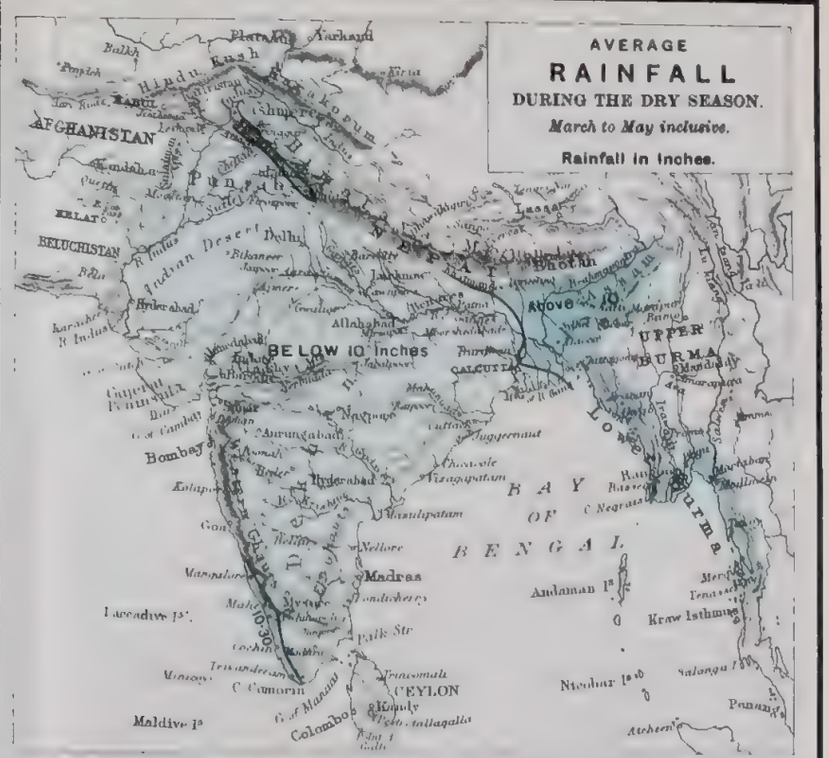
After BLANFORD, BUCHAN, and others,

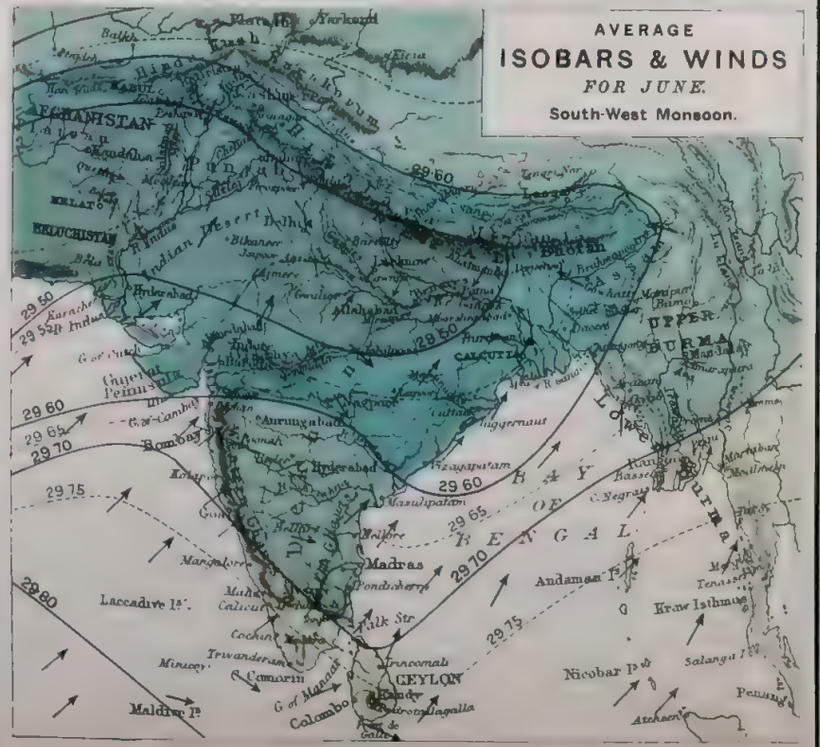
Illustrating Mr. H. N. Dickson's Paper on the Meteorology of India and Surrounding Seas.

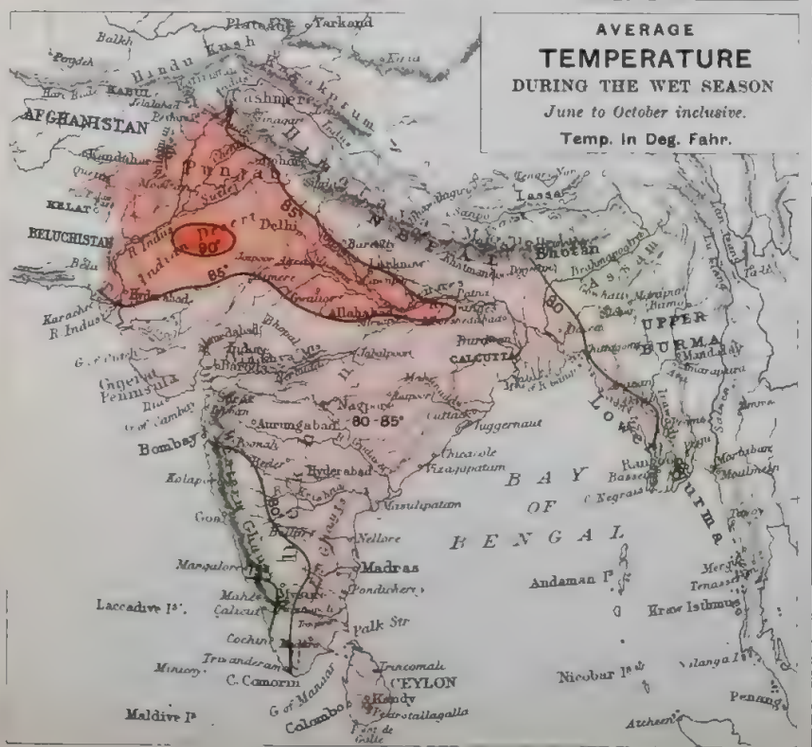
PLATE II

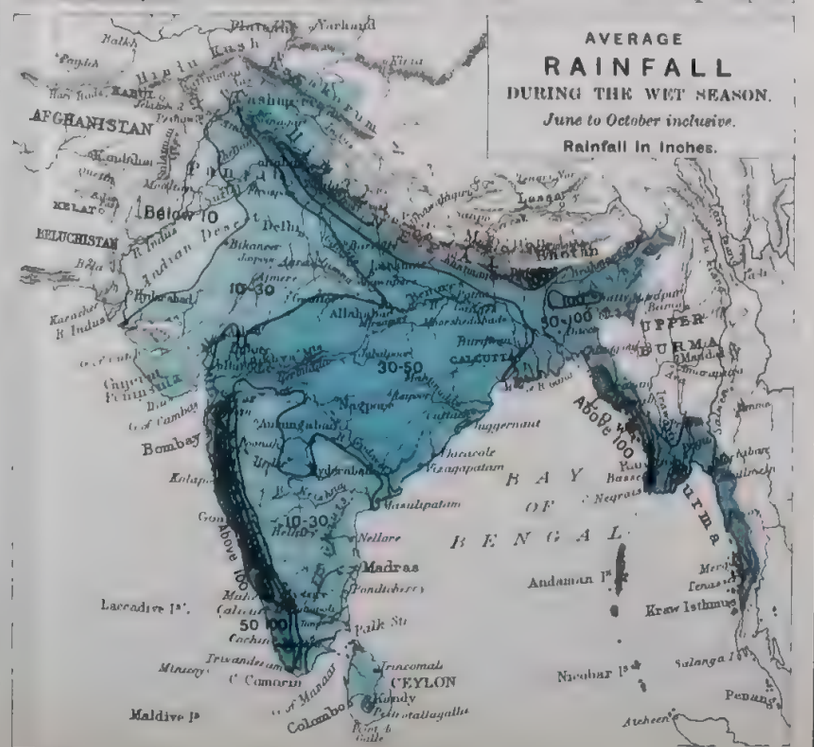












OROGRAPHICAL MAP OF INDIA.

Illustrating Mr. H. N. Dickson's Paper on the Meteorology of India and Surrounding Seas.

PLATE I

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE PYGMY TRIBES OF AFRICA.

By Dr. Henry Schlichter.

Nobody, thirty years ago, believed in the existence of African dwarf tribes, although, as I shall afterwards show, various reliable reports about them existed before that time. But it needed an authority like Dr. Schweinfurth to prove that pygmies actually exist in Africa. Since his discovery of the Akka in 1870, most of our travellers who have penetrated into the forests of Equatorial Africa have brought home reports about these and other pygmy tribes, and although our information may still be incomplete in various respects, yet we have—as will be seen—many facts at our disposal which enable us to treat the whole question critically, and to do this is the object of the present paper.

Immediately after Dr. Schweinfurth's discoveries the attention of geographers was directed to the fact [1] that as early as 1865 Du Chaillu had found dwarfs in West Africa between the Congo and Ogowe; and Drs. Bastian [2] and Falkenstein [3] photographed and described representatives of those who were living on the Loango coast. In the face of this, Professor Hartmann, the celebrated ethnologist, came forward with particulars about pygmies east of the Nile,[4] and Schweinfurth pointed out the remarkable similarities which exist between his dwarfs and the genuine South African Bushmen,[5] whom Fritsch had then just proved to be an entirely different race from the Hottentots.[6] Stanley, as is

[1] Petermann's *Geographische Mitteilungen*, 1871, p. 139, sqq.

[2] Bastian, *Die deutsche Expedition an der Loango Küste*, I. Band, 1874, pp. 136-145.

[3] Falkenstein, *Zeitschrift für Ethnologie*, vol. vi. 1874, Tafel 2.

[4] Westermann, *Deutsche Monatshefte*, vol. xxxvi. pp. 388-390.

[5] Schweinfurth, *The Heart of Africa*, vol. ii. 1874, pp. 139-144.

[6] Fritsch, *Drei Jahre in Südafrika*, 1868, p. 295; Fritsch, *Die Eingeborenen Südafrikas*, 1872, pp. 394, 397, 408.

well known, on his great journey, 1874-77, heard much about dwarfs inhabiting the forests of the Upper Congo, and he has described one whom he met with at Ikondu.[1] The correctness of his views regarding the pygmies has since been substantiated by the great explorer himself, as well as by Wolf, Wissmann, and several others. Serpa Pinto found natives similar to the more northern dwarfs under the 15th degree of S. lat.;[2] and I have previously pointed out that the Bushman-like Mossaro of Schulz and Hammar, who live still more to the south, are in some way connected with the Equatorial dwarf tribes.[3]

Thus it has been proved indisputably that in various parts of Africa native tribes exist which are far below the average height of our species, and belong to the most diminutive representatives of the human race.

In dividing the different pygmy tribes geographically we find that four great groups may be distinguished, viz.:—the dwarfs of West Africa; those of the Central Regions; the East African dwarfs; and the tribes which live south of the Congo Basin. This classification is purely geographical, and future discoveries will probably show that there exist various connecting links between these groups, as can be partly proved even at the present time.

First Group—*Dwarfs of West Africa: Obongo, Akoa, Babongo.*—The regions which these tribes inhabit are the forests between the Gabun, Ogowe, and Congo rivers, where they live scattered among various Bantu tribes. Lenz, who had good opportunities of studying them, says[4] that the Obongo (or Abongo) are found living among the Okanda, Okota,[5] Apinshi, Akelle, Ashira, and other tribes on or south of the Ogowe. They are, however, not found among the Pahuin. Du Chaillu met them near Yengue and Niembue in Ashangoland,[6] and, according to the information which he obtained there, they are likewise found in the Nshavi country, and still further inland to the east.[7]

Other undersized people, the Akoa or Okoa, were found by French explorers in the immediate neighbourhood of the coast as well as more inland. Touchard, as far back as 1861,[8] reported that they were exterminated on the Gabun by the M'Pongoe tribe. But to assume that they were at that time entirely annihilated[9] is incorrect, as Marche, in 1876, found them near Lope, on the Middle Ogowe,[10] and Fleuriot de

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[1] Stanley, *Through the Dark Continent*, vol. ii. pp. 172-173.

[2] Serpa Pinto, *How I crossed Africa*, vol. i. 1881, pp. 319-325.

[3] *Scottish Geographical Magazine*, Oct. 1891.

[4] Lenz, *Skizzen aus Westafrika*, 1878, pp. 114-115.

[5] It must be noted that De Compiègne (*L'Afrique équatoriale, Okanda*, 1875, p. 83) describes the Okota near Edibe on the Ogowe, as 'un vilain peuple; les hommes sont petits et ont l'air faux et méchant, comme ils le sont en réalité.' He further states that, according to Walker's information, dwarfs exist in the neighbourhood of the first Okanda village (Obombi).

[6] Du Chaillu, *A Journey to Ashangoland*, 1867, pp. 270 and 316.

[7] Du Chaillu, *Adventures in the Great Forest of Equatorial Africa and the Country of the Dwarfs*, 1890, p. 448.

[8] *Revue maritime et coloniale*, tome iii. 1861, p. 9.

[9] Hamy, *Bulletins de la Société d'Anthropologie*, 3e. série, tome ii. p. 86.

[10] Marche, *Trois voyages dans l'Afrique occidentale*, 1879, p. 342-344. *Lope*, however, is an *Okanda* village (compare Walker, *Proceedings R. G. S.*, vol. xvii., 1873, p. 354).

Langle describes an Akoa dwarf whom he met in 1868.[1] Both tribes, Akoa and Obongo, are closely allied to each other, and it follows from Lenz's[2] and Marche's[3] observations that the natives on the banks of the Ogowe regard the Obongo and Akoa as identical, an opinion which is, however, not quite proved at the present stage of our knowledge.

Quatrefages describes another coast tribe, the M'Bulu, or Bulu, as relatives of the Akoa.[4] This is evidently an error, as neither Touchard[5] nor Marche,[6] who studied them, has given any proofs that they should be regarded as a dwarf race similar to the Obongo, although they doubtless differ from the M'Pongoe, as the latter explorer states.

The German Loango Expedition furnished information about a third tribe of dwarfs, who live a little more to the south, and are called Babongo, and although Dr. Bastian did not succeed in reaching their encampments and settlements,[7] yet the great number of itineraries which he collected[8] leaves no doubt that many of these dwarfs live among the Bantu tribes in the 'Hinterland' of Loango. As indicated by the name of Babongo, and proved by photographs and measurements, they differ but little from their more northern relatives, the Obongo.

These West African dwarf tribes are in many respects similar to each other, but differ greatly from the surrounding Bantu population. Their stature is considerably below the average of the human race. Lenz, who has measured many Obongo, states that the height of adult men is 4·3, to 4·7 feet, while that of the women is much less.[9] The majority of the Obongo whom Du Chaillu measured (mostly women) were between 4 and 5 feet.[10] Marche found the Akoa somewhat taller, viz., 4·9 to 5·0, and the women 4·6 to 4·7 feet.[11] In spite of their small stature they are well proportioned, strong and nimble. Their skin is usually of a dirty yellow or yellowish-brown colour, and the men, in many cases, have a very peculiar growth of thick hair on various parts of the body.[12] Thus Du Chaillu observed that the young Obongo whom he measured near Niembue had an unusual quantity of hair on his legs and breast, growing in short and curly tufts similar to the hair of the head. He noticed this growth of hair on several other Obongo whom he came across, and all the accounts of the Ashango agreed that the Obongo men were thickly covered with hair in the described manner. Of their language

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[1] *Le Tour du Monde*, 1876, No. 799, pp. 279, 280, and 283.

[2] Lenz, *Westafrika*, p. 110.

[3] Marche, *Trois Voyages*, p. 342.

[4] Quatrefages, *Les Pygmées*, 1887, pp. 240-242. He describes the Bulu (or Chekiani) as 'étouffés entre les Fans et les Pongoués.' But Iradier, *Africa. Viajes y Trabajos*, 1887, tome ii. found the same tribe further inland on the Utamboni river, which proves that on the coast we have only a portion of them, as is the case with the Akoa.

[5] Touchard, *Revue maritime et coloniale*, 1861, pp. 10-14.

[6] Marche, *Trois Voyages*, p. 106.

[7] Bastian, *Deutsche Loango Expedition*, vol. i. pp. 139-140.

[8] *Eodem loco*, vol. i. pp. 136, 143-146.

[9] Lenz, *Westafrika*, p. 112.

[10] Du Chaillu, *Ashangoland*, p. 319.

[11] Marche, *Trois Voyages*, 342-343.

[12] Du Chaillu, *Great Forest*, p. 446.

and some further anthropological details I shall speak later on. As regards their mode of living they do not differ much from the other African dwarfs. The almost impenetrable forests between the Ogowe and the Congo are their home. Here they dwell in temporary shelters and huts—a migratory population who never remain at the same place for any length of time. Whenever game becomes scarce they change their abodes, but do not, as a rule, wander out of their own district, *e.g.*, those of the Ashango country remain there, whilst the Obongo who live among the Nshavi always confine themselves to Nshaviland. Hunting and fishing are their only occupations, and, although in every other respect they are savages of the very lowest type, their cunning and skill as hunters are most remarkable. Bows and poisoned arrows are their chief weapons, and the woods near their encampments and villages are full of traps, snares, and pitfalls, in which they catch not only the smaller animals, but also elephants, pythons, gorillas, etc. In exchange for vegetable food, knives, and other articles, they give dried flesh and fish to their Bantu neighbours, and it is for this reason that they are generally well treated by the Apinshi, Ashango, Nshavi, and other Bantu tribes, who, however, very rarely intermarry with them. They are entirely ignorant of agricultural and pastoral pursuits, and in many cases even unable to cook their food properly, although acquainted with the use of fire. Occasionally, however, as Lenz tells us,[1] the Obongo have learnt the use of cooking utensils from the Okanda.[2] Though brave and plucky as hunters, they are very shy in their intercourse with other people, and it was only with great difficulty that the fragmentary information which we at present possess about them could be obtained.[3]

But as early as in the seventeenth century some reports about these dwarf tribes reached Europe. At the end of the sixteenth century an Englishman, with the name of Andrew Battell, was sent a prisoner by the Portuguese to Angola, and lived there and in the adjoining regions for nearly eighteen years. On his return an account of his travels was published by Purchas in his *Pilgrims*, London, 1625. Battell is the first discoverer of the gorilla, and he further states that north-east of the Loango coast, more than eight days' journey from Mayumbe, little people called Matimbas are found, who are not bigger than boys of twelve years. They are hunters who kill even elephants and gorillas. They pay tribute to a neighbouring chief whom Battell visited. Dapper's great work about Africa,[4] published in 1670, contains several passages about West African dwarfs. He reports that dwarfs with big heads are found at the court of the king of Loango, and that a tribe of these dwarfs, called Bakke-Bakke or Mimos, are living as elephant-hunters and ivory-traders in the wilderness

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[1] Lenz, *Westafrika*, p. 109.

[2] Jephson, *Emin Pasha and the Rebellion at the Equator*, 1890, reports the same of the Akka.

[3] Crampel on his journey to the river Djah found pygmies in about 2° N. lat. Cf. *Le Tour du Monde*, 1889, vol. i. p. 419.

[4] Dapper collected his information chiefly from Blomert, Bruno, Lopez, Linschoten, Purchas, Pigafetta, and Jarrick.

belonging to the territory of the Great Makoko, to whom they are tributary.[1]

There can be no doubt whatever that Battell speaks of the same region in which Du Chaillu discovered the Obongo. As regards Dapper's reports, which refer to a country much further inland, I have to make the following remarks. It is a mistake to suppose that the geographers of the sixteenth and seventeenth century knew nothing at all of the Lower Congo and of the interior of the adjoining territories. Tuckey's Furthest was, until Stanley's discoveries, generally regarded as the last-reached point inland, and the maps and information of former centuries were disregarded as entirely untrustworthy. But only a few years back Savorgnan de Brazza[2] re-discovered the kingdom and capital of the Great Makoko, which is frequently found on the old maps, and mentioned already in the fifteenth century by Diaz and Cada Mosto. This kingdom is situated west of the Congo, some distance above Stanley Pool, and according to Brazza it is laid down tolerably correctly on the maps of the sixteenth century. It is therefore in the neighbourhood of this country that we have to place the Bakke-Bakke dwarfs of Dapper.

Second Group.—*Dwarfs of the Central Regions: Akka, Wambutti, Batua.*—This group represents the most important tribes of the African pygmies. It is impossible at the present stage of our knowledge to divide this group into two parts, because, geographically and ethnographically, so many similarities are noticeable, that such a division would not be justifiable, although it must not be overlooked, on the other hand, that considerable differences exist between the most widely separated members of this group. A glance at the map proves that our present knowledge of them can be but incomplete, because it is impossible that they should only exist at a number of isolated spots without connecting links.

The Akka are the most northern tribe of this group. Dr. Schweinfurth did not see them in their own country, for those whom he met with at Munza's court were only a small colony in the special service of this chief.[3] But south of the Niam-niam country, in Monbuttu and Makraka, and between the Medje, Maigo and Mabode tribes, there are numerous colonies of independent Akka.[4] This name, Akka, is given to them by the Monbuttu, whilst they call themselves Efe, Atshua, or Wotshua.[5] The Niam-niam call them Tiki-Tiki; the Momvu, Voshu or Vorchu; and the Mabode, Afifi. Casati remarks, however, that by the name of Tiki-Tiki a second and different tribe of dwarfs in the Monbuttu country is meant,[6] who are taller, have a darker skin, more vigorous

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[1] Dapper, *Umbständliche und eigentliche Beschreibung von Afrika*, 1670, pp. 527, 571, 572-573.

[2] *Conférences et Lettres de P. Savorgnan de Brazza sur ses trois Explorations dans l'ouest africain*, 1875-1886; Paris, 1887, p. 157.

[3] Schweinfurth, *The Heart of Africa*, vol. ii. pp. 84, 128, 131.

[4] Jephson, *Emin Pasha*, 1890, p. 367.

[5] Casati, *Ten Years in Equatoria*, 1891, vol. i. p. 156; Junker, *Reisen in Afrika*, vol. iii. 1891, p. 88.

[6] Casati, *Eodem loco*, p. 156.

limbs, and are covered with stouter but fewer hairs than the Akka; they inhabit the lofty parts of the Monbuttu country, whilst the Akka live in the forests. Akka and Tiki-Tiki are, according to this information, often at open war with each other. Arguing from similar descriptions of other tribes, and from the fact that they frequently intermarry with other natives,[1] I think there can be no doubt that these Monbuttu Tiki-Tiki are merely half-breeds between the Akka and the Monbuttu. As regards the true Akka, they are described by the various travellers who have now seen and measured them as being on an average not higher than 4 to 4¾ feet.[2] The women seem to be equal in stature to the men. Their colour is of a reddish (or sometimes yellowish[3]) light brown, but Emin correctly remarks that owing to their dirty appearance it is difficult to define it.[4] Their bodies are covered with a thick growth of greyish hair.[5] The hair of the head is of a reddish-brown or rusty-brown colour, and this is one of the characteristic features of this dwarf race, as in the case of all other negro races, even those of a light colour, the hair of the head is always of a deep black. This is so even with the Egyptians.[6] The beard seems to grow much stronger than is usually the case with other African races;[7] and Jephson, who studied the Akka in Emin Pasha's province, says that the dwarfs have often very long beards,[8] hereby confirming a report of Koelle, whose Betsan are likewise described as bearded dwarfs.[9] The Akka generally give the impression of well-proportioned and strong men, but Schweinfurth described those whom he saw as having huge hanging abdomens, which gave them, although adult, the appearance of Arabian or Egyptian children.[10] But this deformity seems only local, as neither Junker nor Casati has noticed it, except among children. They are a nation of hunters, who live chiefly upon game, but they eat almost anything they come across, viz., all sorts of flesh and fish, as well as reptiles and white ants. They are very fond of vegetable food, but being entirely ignorant of agriculture they often raid upon their neighbours, carrying off corn, bananas, sweet potatoes, manioc, and beans. In districts where the neighbouring tribes are afraid of them, they order the chiefs to provide them with the necessary vegetable food, giving, however, skins, etc., in exchange for it.[11] Bows and arrows

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[1] Jephson, *Emin Pasha*, p. 373.

[2] Schweinfurth, *The Heart of Africa*, vol. ii. p. 140; Emin Pasha, *Eine Sammlung von Reisebriefen und Berichten*, 1888, p. 316; Junker, *Reisen*, vol. iii. p. 88; Casati, *Ten Years*, vol. i. p. 156.

[3] Emin Pasha, *Reisebriefe*, p. 315; Jephson, *Emin Pasha*, p. 372.

[4] Emin Pasha, *Eodem loco*, p. 316.

[5] Casati, *Ten Years*, vol. i. p. 156; Jephson, *Emin Pasha*, p. 373; Emin Pasha, *Reisebriefe*, p. 316; Junker, *Reisen*, vol. iii. p. 91, states that the bodies of the Atshua are only partially covered with hair, but the information of the other explorers is so distinct that this can only refer to a local variety.

[6] Casati, *Ten Years*, vol. i. p. 156; Junker, *Reisen*, vol. iii. p. 91.

[7] Schweinfurth, *The Heart of Africa*, vol. ii. p. 140, says that the hair and beard of the Akka are but slightly developed. Also in this case we have to do with a local variety.

[8] Jephson, *Emin Pasha*, pp. 373, 374.

[9] Koelle, *Polyglotta Africana*, 1854, p. 12.

[10] Schweinfurth, *The Heart of Africa*, vol. ii. p. 141.

[11] Emin Pasha, *Reisebriefe*, pp. 315-316.

are their characteristic weapons, which they use very skilfully, but they have also acquired the use of lances and shields, in imitation of the neighbouring tribes. They kill the elephant and buffalo by first blinding them with arrows, and then spearing them to death.[1] Then they encamp near the spot, and remain there till the flesh is consumed. As a rule they have no fixed settlements, but build their temporary huts wherever convenient.[2] But, like the dwarfs of West Africa, they always remain within certain districts, so that, *e.g.*, the Akka of the Mabode country do not go into the Medje territory. It must be noted as an exception that near the river Teli, south of Monbuttu, a colony of Akka has become stationary, forming several villages, under a chief called Mgalima.[3] But the wandering tribes also acknowledge chiefs, who rule according to traditional usages, directing the hunting and commanding the warriors in action. As regards warfare, Junker[4] and Casati[5] affirm that they are much appreciated as warriors on account of their dexterity as archers, their nimbleness, and their bravery. The chiefs of the surrounding tribes are said to compete with each other in securing them as subsidiaries. Also Stanley and Emin describe the dwarfs as warlike and dangerous;[6] and the former heard the same from Arabs who had fought with Batua tribes between the Lomami and Congo. This proves that the pygmies are not always as shy and timid as they are described by many travellers who met them in small numbers in the Equatorial forests.

Stanley, on his last journey across Africa, had ample opportunity to study the dwarfs inhabiting the great Equatorial forest, which extends south of the Niam-niam and Monbuttu countries. As is well known, he followed the course of the Aruwimi river, and, strangely enough, met with no dwarfs between Yambuya and the Ngaiyu,[7] whilst they were numerous east of the 28th degree of east longitude. It is at present impossible to account for their absence on the Lower and Middle Aruwimi, the natural features of this great primeval forest being alike in all its parts. They extend up to the edge of the forest, about five days' march from the Albert Nyanza;[8] whilst a little more to the south they were found still further east, on both banks of the Semliki River.[9] Stanley's Zanzibari men called them Wambutti;[10] and he himself distinguished two different kinds of them, viz., the Batua and Wambutti, the former inhabiting the northern and the latter the southern districts of the traversed territory.[11] I must confess that I found it no easy task to

[1] Casati, *Ten Years*, vol. i. p. 159.

[2] Jephson, *Emin Pasha*, p. 369; Emin Pasha, *Reisebriefe*, p. 315.

[3] Casati, *Ten Years*, vol. i. p. 157; Jephson, *Emin Pasha*, pp. 371-372.

[4] Junker, *Reisen*, vol. iii. p. 92.

[5] Casati, *Ten Years*, vol. i. p. 159-160.

[6] Stanley, *In Darkest Africa, or, the Quest, Rescue and Retreat of Emin, Governor of Equatoria*, 1890, vol. ii. pp. 95, 248; Emin Pasha, *Reisebriefe*, pp. 315-316.

[7] Stanley, *Darkest Africa*, vol. ii. p. 92.

[8] Jephson, *Emin Pasha*, p. 369.

[9] Stanley, *Darkest Africa*, vol. ii. pp. 96, 241, 248, 250, 262; Casati, *Ten Years*, vol. i. p. 157.

[10] Jephson, *Emin Pasha*, p. 369.

[11] Stanley, *Darkest Africa*, vol. ii. p. 96.

classify these two tribes ethnographically, but after carefully comparing them with their northern relatives, the Akka, as well as with their southern ones, the Batua south of the Congo, I came to a conclusion which tallies with certain remarks which Stanley himself made,[1] viz., that his Batua are identical with the most southern branch of the Akka; whilst the Wambutti, who differ greatly from them, belong to the Batua group, which Grenfell, Bateman, Wolf, Wissmann, and François discovered south of the Congo. Junker's Atshua (or Watshua) are Stanley's Batua, and therefore are Akka, and Junker no doubt is correct in saying that Atshua and Batua are synonymous terms.[2] It follows that the word "Batua" signifies two different kinds of dwarfs, viz., those belonging to the Akka group found north of the Congo, and those who live south of the Congo and are near relatives of the Wambutti. Moreover, also, the Bushmen and other South and East African tribes are called Batua[3] and Watua,[4] which is therefore quite a general name, probably of Bantu origin. To prevent confusion, I propose to avoid the word Batua as much as possible, or to limit it to that pygmy group for which no other name is known, viz., the Batua south of the Congo.

Life in the forest has to a certain extent modified the appearance and customs of this branch of the Akka. Their bodies are not so well proportioned,[5] and, although still daring and warlike, they are somewhat less active in this respect than the Akka of the open country to the north. They migrate less frequently, and their dwellings are larger and much better built than the very small and miserable huts of the Monbuttu Akka.[6] As regards the Wambutti, they are decidedly superior, both bodily and mentally, to the southern Akka. For instance, the latter are entirely ignorant of the use of nooses and nets for hunting purposes,[7] whilst the Wambutti have devised ingenious methods for catching the chimpanzee and other monkeys,[8] and are very skilful in constructing nets, sometimes 100 yards long, of grass and bark fibres.[9] Their greater intelligence is further proved by the many tricks and precautions which they employ in their intercourse with their neighbours and with foreigners,[10] and Parke's servant is an instance of how quickly they are able to pick up languages.[11] As a special characteristic of the Wambutti, Stanley mentions their large and beautiful eyes, whilst the Akka have small and malicious-looking eyes, which add greatly to their ugliness.[12] In Ikondu, on the Upper Congo, Stanley found a specimen of the Watwa dwarfs,[13] of whom the

[1] Stanley, *Darkest Africa*, vol. i. p. 352. [2] Junker, *Reisen*, vol. iii. p. 88.
[3] Fritsch, *Die Eingeborenen Südafrikas, ethnographisch und anatomisch beschrieben*, 1872, p. 394.
[4] Cust, *Modern Languages of Africa*, vol. ii. 1883, p. 448.
[5] Stanley, *Darkest Africa*, vol. i. p. 352.
[6] Jephson, *Emin Pasha*, pp. 369-370; Casati, *Ten Years*, vol. i. p. 157.
[7] Casati, *Eodem loco*, p. 159.
[8] Stanley, *Darkest Africa*, vol. ii. p. 93.
[9] Parke, *My Personal Experiences in Equatorial Africa*, 1891, pp. 251, 397.
[10] *Eodem loco*, p. 252; Stanley, *Darkest Africa*, vol. ii. p. 95.
[11] Parke, *Experiences*, p. 398.
[12] Stanley, *Darkest Africa*, vol. i. p. 352; vol. ii. p. 96.
[13] Stanley, *Through the Dark Continent*, vol. ii. p. 172.

Arabs near Nyangwe had told him much. Some years later both Dr. Wolf, on his journey in the Bakuba country,[1] and Bateman, during his exploration of the Kasai,[2] discovered Batua tribes in about 5° S. lat. At the same time Grenfell found other Batua on the Lomami; and Grenfell and François on the Tshuapa and its tributary, the Bussera;[3] whilst Wissmann, on his two journeys across Africa, proved their existence, not only in the Bassonge and Batetela countries, but also east of the Congo, in Ubudshwe, and in Goma close to the western shore of Lake Tanganyika.[4] Thus we see that these Batua tribes extend over the whole southern part of the Congo basin, and doubtless many more reports about them will be brought home by future travellers. Except the fact of their existence, very little is at present known of them; for, unlike their more energetic relatives in the north-east, they are usually very shy and timid in the presence of foreigners, which makes observations almost impossible. From a somewhat detailed report by Dr. Wolf,[5] as well as from the information of the other above-mentioned explorers, we gather that they have an average height of 4·4 to 4·7 feet, are of a dark brown colour, somewhat lighter than their Bantu neighbours, and present the appearance of a well-developed, and not at all degenerate, race. They are hunters like all the other pygmy tribes, and frequently intermarry with the surrounding Bantu population, except within the most secluded districts of the primeval forest, where pure Batua may still be found.

As regards their mode of living, the different pygmy tribes inhabiting the great Equatorial forest region, viz., the southern Akka, Wambutti, and southern Batua, are so exactly alike that it is impossible to treat of them separately. As nomadic hunters, they wander about the forests, building their huts in the clearings wherever game is plentiful. Like the pygmies of the Monbuttu and Ashango countries, they are experts in killing even big game, such as elephants and buffaloes, either with spears and poisoned arrows or by means of traps and pitfalls. Their intercourse with the various Bantu tribes among which they live is usually of a friendly nature, partly because the latter are afraid of them and their poisoned arrows, and partly because the pygmies supply these Bantu tribes with flesh and skins in exchange for vegetable food, spears, knives, and sundry articles, *e.g.*, cooking pots, which may be regarded as belonging to the luxuries of African pygmy life. Moreover, they are thoroughly at home in the forest, and are therefore indispensable to their Bantu friends as spies and scouts in times of feuds and warfare. The sites of their villages and encampments are always carefully selected to avoid surprise, and Stanley describes their daily life as being similar to that of the

[1] Wissmann, Wolf, François, and Müller, *Im Innern Afrikas, Die Erforschung des Kassai*, 1888, pp. 256-262.

[2] Bateman, *The First Ascent of the Kasai*, 1889, pp. 23, 68, 145.

[3] François, *Die Erforschung des Tschuapa und Lulongo*, 1888, pp. 111-115, 146-148, 155-160.

[4] Wissmann, *Unter Deutscher Flagge quer durch Afrika von West nach Ost*, 1889, pp. 210-211; *Meine zweite Durchquerung Aequatorialafrikas vom Congo zum Zambezi*, pp. 129-132, 190.

[5] *Im Innern Afr.*, pp. 258-261.

Bantu population. The women do all the domestic work. They erect the beehive-like huts, covering them with skins or *Phrynium* leaves, they collect wood and vegetable food, watch the fires, and dry flesh. When the families and the tribes change their quarters, they carry the provisions and the few utensils which have to be transported from one encampment to another. The men, on the other hand, spend most of their time in hunting or bartering with the neighbouring tribes. They seem to be fond of smoking, and, like other savages, of discussing the interests of the community in long palavers. They usually speak the dialects of their Bantu neighbours, but all travellers inform us that they also possess a distinct language of their own. About this language, of which we have at present but a very slight and imperfect knowledge, as well as about some anthropological details, I shall speak afterwards.

Third Group.—*East African Pygmies.*—This forms one of the most interesting parts of our present investigation. Long before Du Chaillu's and Schweinfurth's discoveries, travellers in Kaffa, Shoa, Southern Abyssinia, and other East African countries, heard of pygmy tribes in the Interior, and the information was in several cases so distinct and definite, that it could hardly be regarded as entirely without foundation. Nevertheless, all these reports were ignored, until the existence of other pygmies was proved, and, as far as I know, up to the present time no critical view of this question has been attempted, although Cust, Quatrefages, Hartmann, Hamy, and others are inclined to believe in the existence of these East African pygmies. I have, therefore, collected and compared all the reports about them, and shall try to give a correct reply to the question:—Do pygmy tribes exist in East Africa, and if so, where? As far back as 1826 Captain Boteler brought information about East African dwarfs.[1] When staying at Mombasa, he found that immediately inland of the Wanika live the Meric Mungoan. These people stated that in a certain district, between their country and that of the Wanika, there was a race of pygmies, scarcely three feet in height. They called them Mberikimo, and stoutly affirmed the fact of their existence. They asserted that the journey from Mombasa to their country took six weeks. That this story is based upon some actual facts, is proved by Leon des Avanchers, who, thirty-three years later, obtained exactly the same information while on the Zanzibar coast.[2] On his map, issued in 1859, he places a pygmy tribe with the name of Wa-Berikimo in 34° E. long. and 1° N. lat., and from numerous reports he draws the conclusion that these pygmies really exist somewhere in the regions indicated. This information—as has just been mentioned—was obtained on the Zanzibar coast, but when travelling in Abyssinia, Shoa and Kaffa, Harris, Krapf, d'Abbadie, Hartmann, and several others, heard much about the existence of pygmies in the unexplored southern territories. Harris says:[3]—

[1] Boteler, *Narrative of a Voyage of Discovery to Africa and Arabia*, vol. ii., 1835, p. 212.

[2] Avanchers, *Esquisse d'une carte des pays Oromo ou Galla: Bulletin de la Société de Géographie*, 4e série, tome xviii. pp. 154 and 163.

[3] Harris, *The Highlands of Ethiopia*, 2d edition, 1844, vol. iii. p. 63.

"Beyond the extensive wilderness which bounds Kaffa to the south are the Doko, an exceedingly wild race, not much exceeding four feet in height, of a dark olive complexion." Krapf gives very detailed information about them.[1] He states that he heard of these pygmies not only in Shoa, but also in Barawa and Ukambani. In the latter country he heard of the Wa-Berikimo of Boteler and Avanchers. In Shoa, Krapf obtained his information from a native of Enarea whom he, as well as Dr. Beke, found intelligent and reliable. This man travelled with the slave-hunters from Kaffa to Tuffte, from there to Kullu, and then in a couple of days to the Doko country, which he described as a swampy region full of bamboo forests, and inhabited by pygmies who are about four feet in height. Their colour is of a dark olive-brown, and they are perfect savages. They have no chiefs, no weapons, are ignorant of agriculture and other occupations, and their food consists of wild fruits, roots, honey, serpents, and smaller animals. They wear no clothing, have thick and protruding lips, flat noses, and small eyes. Their hair, however, is not woolly. They do not know the use of fire, and eat the flesh of serpents and other animals raw. Their only ornaments are the vertebræ of serpents, which they wear round their neck. The slave-hunters of Susa, Kaffa, Dumbaro, and Kullu often make raids on them, and, in spite of their low and savage customs, the Doko slaves are said to be intelligent and docile. Krapf met one of these slaves on the east coast at Barawa, and found that he fully corresponded to the descriptions current in Shoa about the dwarfs. He was about four feet high, of a dark colour, and very active. The Barawa people confirmed the reports that there was a race of pygmies in the interior, inhabiting a country to the north-west of Barawa.[2] D'Abbadie, another well-known traveller in these regions, has, on various occasions, spoken about the dwarfs south of Kaffa.[3] He does not actually regard them as "pygmies," but, at the same time, he describes them distinctly as dwarfs. I have found this incongruity in various authors, the oldest of whom is Strabo.[4] The name "pygmy" seems to imply to them some mythological qualities or characteristics of which an ordinary dwarf is devoid. But I shall afterwards show that the majority of ancient geographers simply regarded the pygmies as undersized people, and there is no scientific reason whatever, either in ancient or in modern geography, to make a distinction between pygmies and dwarfs. Now, d'Abbadie states that the Doko country (which he places between 36° and 38° E. long. Greenwich, and 4° and 5° N. lat.) is inhabited by different nationalities of black, or almost black, colour, forming more than thirty communities, and speaking several languages.[5] Some other tribes more to the north he likewise regards as belonging to the Doko. From this it is

[1] Krapf, *Reisen in Ostafrika*, vol. i. 1858, pp. 76-79; vol. ii. 198.

[2] *Bulletin de la Soc. de Géogr.*, 3e série, tome ii. p. 121.

[3] D'Abbadie, *Bulletins de la Société d'Anthropologie de Paris*, 3e série, tome ii.; *Note sur le Haut Fleuve Blanc: Bull. de la Soc. de Géogr.* 3e série, tome xii. pp. 144-161.

[4] *Geogr.* vol. xvii. c. 2.

[5] D'Abbadie, *Bull. de la Soc. de Géogr.*, 3e série, tome xii. *Map*; 4e série, tome xvii. p. 172.

evident that the Doko embrace a variety of different tribes, some of which d'Abbadie describes as strong and stout like the Swahili,[1] and others as being only 5 feet high, a fact which he ascertained personally.[2] Moreover, to the west of the Doko country he places another diminutive tribe, the Maze Malea, who are only 4·9 feet high, and speak the Suro language;[3] and, while staying at Bonga in Kaffa, he obtained authentic information that to the south of the countries of Kullu and Mekan Sukoro tribes exist beyond the river Gojab whose stature is that of boys of about fourteen years of age, viz., between 4 and 5 feet.[4] Hence these different reports of d'Abbadie strongly corroborate Krapf's statements. Leon des Avanchers, who, as we have seen, collected information about these dwarfs on the Zanzibar coast, furnished further valuable material about them while living at Gera, a district to the south of Enarea.[5] He reports that in the neighbourhood of the Doko there live very short people, the Areya, and still more to the south a tribe called Cincalle, who are about as tall as boys of ten or twelve years of age. He adds that many of these dwarfs are met with in Gera. They have large heads, are ugly, and not more than 4 feet high. Professor Hartmann gives further proof of the existence of the Doko pygmies. During his stay at Fazoklo he collected a number of reliable reports,[6] which describe them as dwarfs of 4 to 4½ feet in height, living to the south of Susa, Kaffa, and Gurague. This information also in other details tends to confirm that of Krapf, d'Abbadie, and Avanchers. They are of a dark-brown or dark yellowish-brown colour, with short hair, and are extremely ugly in physique. They go entirely without clothing, and build most primitive huts, which they cover with skins or leaves. Hunting is their only occupation, and they are experts in catching the animals of the forests in traps and pitfalls. They use only wooden weapons, and, according to some reports, poisoned arrows. They never remain long at one place, but change their quarters as soon as game becomes scarce. They are entirely ignorant of agriculture, but collect all sorts of wild fruits. Their full-sized neighbours fear and avoid them as strange and dangerous beings.[7] Summarising the different reports, we see that Avanchers met with many of these dwarfs in Gera, Krapf saw one of them in Barawa, and d'Abbadie came across several while travelling in Kaffa: hence we have three distinct instances in which European travellers of acknowledged authority, independently of each other, bear witness to their existence. But in many respects still more important is the *indirect* information which we are in possession of. Professor Hartmann's reports were published at a time when little was known about the Akka and Abongo, and nothing at all about the Watwa,

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[1] *Athenæum*, 1845, p. 243.

[2] *Eodem Loco*, p. 360.

[3] *Bull. de la Soc. de Géogr.*, 3e série, tome xii. *Map.*

[4] *Bull. de la Soc. d'Anthropologie*, 3e série, tome ii. p. 100.

[5] Avanchers, *Bull. de la Soc. de Géogr.*, 5e série, tome xii. p. 171.

[6] Hartmann, *Die Nigritier*, 1876, pp. 495-496.

[7] Compare also Cecchi, *Da Zeila alle Frontiere del Caffa*, vol. ii. 1885, p. 463 :—"Da un' altra parte poi abitano degli uomini piccolissimi."

Wambutti, and Batua, and yet his description of the Doko pygmies, which he obtained from reliable persons at Fazoklo, is word for word the same as one may find about the just-mentioned Equatorial dwarfs in the works of Stanley, Wolf, Wissmann, Lenz, and others. Harris, Krapf, and Hartmann, as we have seen, call these pygmies *Doko*, a name which occurs with all authors who have written about the countries south of Kaffa, whether they have heard about pygmies or not.[1] That people called Doko exist is therefore beyond dispute. It seems, however, that this name does not signify a special tribe, but is a collective name, applied, according to d'Abbadie, to different people who speak various languages. This explains the varying accounts which several travellers gave about the Doko. But all agree in this, that they inhabit the country south of the river Omo. D'Abbadie placed them between 4° and 5° N. lat.[2] But the recent explorations of Cecchi, Borelli, Teleki, and Höhnel have proved that the course of the Omo is different from what it was supposed to be, and it is now generally assumed that this river turns to the west in about 6° N. lat. and flows into the Basso Narok. The Doko country is therefore, in all probability, situated between this river and the Basso Naebor, between 5° and 6° N. lat. and 36° and 38° E. long. Greenwich. The other dwarf tribes of which we have heard, the Maze Malea, the Areya, and Cincalle must all be looked for in the neighbourhood of this locality, and I feel confident that I shall not be committing any serious error in affirming that these regions are inhabited by pygmies, who are probably scattered among other tribes of different race and customs, similarly to their relatives in West and Central Africa.

A glance into Schweinfurth's celebrated work, *The Heart of Africa*, will prove that this distinguished traveller never studied the Akka pygmies in their own country, that he never saw their domestic life and settlements, and that he had not even found them in their usual mode of living. All his information was derived from a number of Akka whom he met at the court of the Monbuttu chief, Munza.[3] What Dr. Schweinfurth reported about the Akka did not amount to more than what we have learnt from Harris, Avanchers, Krapf, d'Abbadie, and Hartmann about the Doko and other East African pygmies, and in the face of this I think we have some good right to say that *east of the Nile and to the south of Kaffa, in the yet unexplored territories to the south of the river Omo, there exists a pygmy race similar in size, appearance, and habits to the dwarfs of the Upper Nile and Congo regions.*

(To be continued.)

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[1] Compare, besides the above-cited authors, Dr. Beke, *Journal of the R.G.S.*, vol. xii. p. 87; vol. xvii. p. 66 and *map*; Borelli, *Ethiopie Méridionale*, 1890, pp. 437, 440, 444. Borelli's picture of a Doko child (p. 313) and Schweinfurth's picture of an Akka (*The Heart of Africa*, vol. ii. p. 134), are similar in many respects.

[2] Krapf and M'Queen placed them in 3° N. lat., which is a good deal too far south.

[3] Schweinfurth, *The Heart of Africa*, vol. ii. p. 131.

THE NEW HEBRIDEANS.

By the Rev. Jas. H. Lawrie, of Aneityum.

The strange diversity of languages spoken by the natives of the New Hebrides Islands has led to the oft-repeated inquiry, How have these been originated? Where has this people come from? Theories there may be in abundance, but with our present knowledge these questions cannot be easily, or satisfactorily, answered. The people are confessedly children of Ham, so that their original home must be Africa, but thousands of years seem to have elapsed since the first contingent came wandering across the ocean and landed on the great island of New Guinea, the head-quarters of the Papuan race, to which the bulk of the New Hebrideans decidedly belong. They have crisp frizzy hair; their skin is of a burnt coffee colour; their foreheads are fairly intelligent. A race of men somewhat resembling the inhabitants of Western Polynesia are found on the Andaman Islands in the Indian Ocean; they have curly hair like the Papuans, and their features and habits generally imply a common origin. When the great migrations took place, they may have tarried midway between Africa and New Guinea. These natives have been called Negritos, and certainly they are far removed in type from the Hindus on the neighbouring continent.

On the smaller islands of Futuna, Aniwa, Fila, Mele, and a part of Emai, there has evidently been an admixture of Malayan blood, the skin of the majority of the natives on these few islands being a shade lighter than that of their neighbours, and the language spoken somewhat akin to the Samoan. This has evidently been a later immigration, and the new-comers have not been numerous enough to efface the Papuan cast of countenance or the crisp frizzy hair of the aborigines of these smaller islands. This is an additional reason for believing that the Papuans of western Polynesia have sprung from a common source, although they may have come by different routes. In this connection, the way in which the Tanna men cord their hair, a custom which may be observed in the ancient sculptures of Persia, is noteworthy. The earliest pioneers of the tribes may have been carried from their original home as slaves, and through successive generations, repeated divisions, and intermingling with other tribes on their way to the South Pacific Ocean, have adopted new customs and altered some of their heathenish practices, until, as will be seen from what follows regarding the differences in their languages, idolatrous customs, style of dress, and weapons of war, the New Hebrideans may be looked upon rather as a number of peoples than as a united whole.

Judging from the distinct differences in the heathen and idolatrous customs of the natives on the thirty inhabited islands of the New Hebrides group, we may be almost certain that the migrations did not all take place at one time or from one quarter, but, like drift sea-weed on the surface of the ocean, war parties, or refugees from war, or in some cases strayed fishing parties, may from time to time have been carried in

their log canoes by wind and current, until one by one the islands were occupied by the progenitors of the present inhabitants.

As evidence that the islands were not all peopled at the same period, it may be stated that while in the centre of the group some six thousand natives, dwelling on Efate, Nguna, Tongoa, and other smaller islands, speak the same language in varying dialects, on all the islands to the north and south of these *distinctly different languages* are spoken by the other sixty thousand natives, and even on some of the larger islands the natives of one district are wholly unable to understand the language spoken by their brethren at no great distance from their own home. On the island of Tanna the missionaries have ascertained that three languages are spoken among seven or eight thousand people, and on Malekula five languages are spoken among, as has been estimated, twelve thousand people; on Santo, with a still larger population, the confusion of tongues is proportionately aggravated. This confusion of tongues may best be illustrated by a few examples of the names by which two such common objects as the sun and moon are called :—

	Sun.	*Moon.*
English		
Aneityumese	Nangesenga	Inmohog.
Tannese	Meri	Makua.
Futunese	Tara	Tamrama.
Eromangan	Nipminen	Itais.
Efatese	Elo	Atelag.
Ngunese	Elo	Telagi.
Epian	Maregio	Simberio.
Ambrimese	Yal	Ol.
Malekulese	Niar	Nebur.
Maloese	Alo	Vitu.
Santo, N.W.	Metanialo	Wula.

Unlike the inhabitants of Eastern Polynesia, the New Hebrideans have no great king ruling over an island or group of islands; the dominion of each important chief is limited in extent, being usually bounded by headlands jutting into the sea, and, petty jealousy and enmity tending to keep up tribal warfare, the feeling of isolation is intensified with all its evil consequences. It has often occurred in the case of labourers, brought back from Queensland and landed at their own island, but not in the district from which they had been taken three years before, that after the departure of the vessel they have been attacked, their property taken from them, and occasionally they themselves killed, cooked, and eaten. In districts which have been evangelised by missionary effort these horrid practices have ceased, but as a matter of fact all the larger islands in the north end of the group, such as Ambrim, Paama, Malekula, Santo, etc., have yet to be evangelised, and in these places savage cruelty still holds unbridled sway.

As an illustration, we may mention that over a large district on Malekula it is the custom to knock out the two upper front teeth of girls before marriage. When a girl reaches the age of, say, ten years, she is taken and held flat on the ground by half a dozen old women, and a man

—probably a medicine man—with a piece of wood for a punch and a stone for a mallet, knocks out the two front incisors. It may be to them a mark of beauty, or, what is more likely, an evidence of subjection to the lords of creation; in any case, the cruel custom is insisted on, and the cries of the girl-wife are drowned by the louder cries of the women, who have undergone the same operation when they were at her age. The wound soon heals, a feast is made, and all rejoice at the fact that another belle has been admitted into the womanhood of the tribe. The value of a wife on that island is ten boar pigs with long tusks, and, as they are polygamists, a man need not limit himself to one wife if he is able to purchase more. The lot of married women there is miserable in the extreme; they are downtrodden, and, instead of being helpmeets, are virtually slaves. As far as we are aware, this practice of knocking out the teeth does not prevail on any other island in the group. A system of *caste* prevails among the northern islanders, which is unknown in the south. Women in Malekula are not allowed to eat with the men, nor are the men of one rank allowed to eat with those of another, nor to eat food prepared at their fire or even at a fire kindled from theirs. There are four of these grades, the highest of which is only reached when a man has during a number of years contributed and slaughtered for the public feasts one hundred boar pigs with long curled tusks. The ivory tusks are afterwards used by the men for bracelets and neck ornaments. On Epi and other islands two or three curled boar-tusks are attached to a cord and tied round the neck, so that they stand out from the back of the wearer's neck like hat-pegs. In the island of Malo there are no fewer than *ten* grades to be passed through in this caste system before a man can attain to the coveted position of a chief of the highest rank; in all this the killing of pigs plays an important part.

This absence of uniformity among inhabitants of different islands is further seen in the ordinary dress of the people. The men, being professed warriors, dispense with everything of a cumbersome nature, a narrow band being considered sufficient. The fancy patterns on their faces, made with red ochre, charcoal, and oil, with which they decorate themselves for feasts, dances, and sing-sings, are very ingenious. In time of mourning, instead of the traditional dust and ashes, they commonly use soot mixed with oil smeared over the face and breast, but on Epi a coat of whitewash on the head, face, and body is the fashionable mourning costume. The accusation was once formulated by an anti-missioner, that the missionaries were killing off the natives with trousers and prayers. It is certain that prayers do not kill, and as for clothing, while there are, certainly, natives who lack common sense in its use, there can be no objection to the cloth loin-girdle and shirt which the Christianised men usually wear.

On most of the islands the women exhibit considerable skill in the manufacture of their native dress and kilts of matting. On Santo and Malo the women, for the most part, are contented with the original fig or other leaves, without any attempt at manufacture. On Malekula and Epi a neatly-woven kilt of matting is tied round the waist; it is made from narrow strips of dried *Pandanus* leaves, and is worn from ten to

twelve inches deep. On Ambrim the fashion changes to short fringe grass skirts, of which eight or ten are tied round the waist one above another, the deepest being about twelve inches in length, and the rest graduated upwards until the uppermost ornamented fringe is only two inches deep. On Tongoa, Nguna, and Efate kilts of a somewhat different fashion were formerly used, but long print garments are now common on these islands. Coming south to Eromanga, we find the improvement in women's dress very marked indeed. On that island six or eight fringe skirts are used reaching below the knee, while an outer ornamented one trails on the ground. On Tanna, Futuna, and Aniwa decent fringe skirts are used, but shorter than those on Eromanga. On Futuna an unmarried or childless female can be recognised by the dress being left open at the sides, whereas in the case of mothers it is closed all round. On Aneityum, although every woman and girl wears a large print garment, she would have the feeling of being unclothed without the native-made fringes, of which three or four are worn together. The material these skirts are usually made from is *Pandanus* leaves chewed and soaked in water to make them soft; by way of ornament several banana leaves are frayed out and introduced here and there to form stripes on the dress. Thus it will be seen that, upon the whole, even among the heathen natives, women are more modestly clothed than the men. On some islands the hair of the head receives a large share of attention, and on others it is left to grow naturally, with an occasional coating of lime to kill insect life and to keep the head clean.

On Santo the women shave the hair on both sides of the head, leaving a narrow strip in the middle standing up like a cock's comb, and at the northern end of Santo the chiefs are distinguished by a peculiar white shell, about the size of a breakfast cup, which is fastened to the hair in front, and makes them very conspicuous.

On Malekula some of the men wear a rope band round the head, which, being often smeared with black pigment and oil, does not add to their beauty. Many of the women on that island have their hair matted with oil and dirt in a most unseemly manner.

On Tongoa, in former years, a peculiar-looking shade for the eyes used to be tied round the head, the brow and shade being smeared with turmeric. On Efate the men and women wear their hair very short, but on Tanna, and to a limited extent on Futuna, the most peculiar fashion of all is in vogue among the men; they work up their hair into small cords, four or five hundred of these, wrought round with vegetable fibre, hanging from twelve to fifteen inches down the back. Such a head-dress is the work of years. The same style was worn on Aniwa and Aneityum before these islands became Christian. The natives are fond of decorating their hair with plumes of hawks' and cocks' feathers, and also neat wooden combs somewhat resembling ordinary forks. Bamboo scratchers are worn as every-day ornaments in the hair.

Huge masks, from 18 to 24 inches high, are worn at the heathen ceremonies on Malekula and the neighbouring islands. Beads, whales' teeth, and shell ornaments are hung in abundance round the neck. Tortoise-shell earrings, round pieces of wood an inch in diameter, and

other articles, are inserted in the ears. Some of the natives wear handsome shell bead armlets, on which they place great value. Vandyked and diamond patterns are neatly wrought on these with black and white beads. Such ornaments are possessed only by leading men.

Beautiful white *Oculum* shells are worn on the arms on some islands as a mark of distinction, and a small variety of the same shell used to be so much valued by the Eromangan chiefs that a boat-load of sandal-wood could be purchased for a pair of them. The circular opening of the *Turbo* shell is ground down into a fine armlet, and worn by the women in the northern islands. The Tongoans possess handsome armlets made of tortoise-shell, and the Futunese neatly carve similar ornaments from coco-nut shells ground down from both ends to a breadth of about half an inch. Tightly-fitting guards for the bow-string are worn on the wrist by some of the northern islanders.

The musical instruments of the people are few in number, but Pan-pipes are used, the primitive instrument from which the magnificent organs of modern times have been evolved, as well as a bamboo flute, and a conch or trumpet shell. By beating on hollowed log drums from 4 to 10 feet in height, they can produce sounds which to them are as much a language as the bugler's call is to a civilised army. A considerable degree of skill is exercised in the hollowing out of these log drums through a narrow opening only three inches broad.

On Epi and some other islands a peculiar band is tied round each leg, with a number of hollow dried nuts attached to it, which, when the dancing and singing are going on, add a jangling sound to the noise.

The arts, as far as they are practised, exhibit great differences on the various islands, no less than language, customs, and dress. Ever since Quiros, the celebrated navigator, visited the island of Santo in the year 1606 the natives have made rude clay pottery which they use for cooking purposes. Strange to say, to no other island has this art been extended. On Tongoa, and other islands, pudding plates, *kava* bowls, canoe bailers, and yam knives are cut out of solid wood. The very ancient and wide-spread method of preparing bread by covering it with heated wood ashes is known to the natives of the New Hebrides. They, too, cook their food in earth-ovens. A hole is dug in the ground, in which a large fire is kindled with a heap of stones piled on the top. When these are thoroughly heated, they are removed with the aid of a long piece of wood partly split up, which serves as a pair of tongs. The hole is then lined with leaves, and the prepared food is piled in—taro, yam, puddings, fish, fowl, pig, or whatever there may be for supper. The heap is now covered over with leaves, the heated stones are piled over the whole, more leaves are put on, and the mound is banked up with the earth which was originally dug out of the ground. In two and a half or three hours the oven is opened, and the steaming hot food is found to be thoroughly cooked and deliciously flavoured in its own juices. The natives take a full meal only at sunset, but at any odd time during the day they eat bananas, bread-fruit, or chestnuts, chew sugarcane, and drink coco-nut water. Ingenious water-bottles are made out of coco-nut shells from which the kernel has been extracted. Four or five of these

are fastened together with cord, and when filled with water are easily carried on the shoulders suspended from either end of a stick. The largest size of bamboo is also used on some islands for carrying water; this strange bucket, from six to eight feet long, with an opening made in the side at one end, is like an enormous flute. Neatly carved lengths of bamboo are used for head-rests or pillows on some islands; on others a curious pillow is constructed from a branch of a tree raised from the ground on its own twigs left at each corner. The nape of the neck is hardened by exposure, and the natives do not seem to think this single-bar pillow uncomfortable. *Napamas*, or native bark-cloth, was commonly made on Aneityum and most of the other islands before the introduction of calico. The inner bark of a tree was soaked in water and then beaten with a notched stick, which left a pattern on it when dry. On Efate, Nguna, Tongoa, Emai, and other islands, this cloth was dyed a brownish-yellow and fringed with bird's feathers. On Eromanga a pattern was painted by hand on the white ground with red and black pigments: these patterns somewhat resembled clusters of leaves. The Eromangans carve a similar pattern on the handle of their delicately made star-clubs, and the same pattern was formerly tattooed on the cheeks of the Eromangan women. All the islanders know how to convert *Pandanus* leaves into various articles of utility; sleeping mats are woven out of this material; *Napavaks* or carpets are made from it, as well as sun-hats, fans, waist-bands, and fringed skirts, and in some cases even thatching is secured to the roofs of the huts with these tough leaves; but the most general use to which the *Pandanus* leaves are applied is the manufacture of a kind of bag or basket which, on the Christian islands, is used for carrying food and also books. The Futunese are special adepts in the art of making these baskets and sleeping mats, and they usually have a quantity of them on hand for sale or barter when vessels happen to call at that island. What a wonderful field the New Hebrides group is for ethnological study, with its varieties of language, customs, dress, and arts, numerous indeed for such a confined space! even in the weapons of war there is no sameness. It is most noticeable that the styles of manufacture on the several islands are totally different; but how these distinctive patterns have originated it is difficult to surmise.

On the southern islands the spears are merely sharp-pointed hard wood saplings from nine to twelve feet long, whereas on the northern islands the spear-heads are often elaborately carved into barbs and points, while in some cases human bones are inserted.

On several islands the bows are large and not unlike the huge bows of Old England; on Ambrim they have an elegantly upturned pointed end, which can be used as a spear when the quiver is empty. The bow of the Eromangans is noted for its neatness; it is the smallest in the group, but the arrows from its string are none the less deadly. Many of the hard-wood points on the ends of the reed arrows are covered with barbs well carved in various patterns; on some of the islands the arrows are poisoned with vegetable matter mixed with blood. The different patterns of the clubs on the several islands are noticeable by the most careless observer. It may be mentioned that guns having been intro-

duced by the traders and labour agents from Queensland, Fiji, and Noumea, these weapons have now become much more common than the native club, spear, and bow.

The war-club of Aneityum is from four and a half to five feet long, diamond-shaped at the striking end, and of very hard wood. There were also fancifully-shaped clubs with projecting points like the neck and beak of a heron—ceremonial maces carried at the heathen dances.

On Tanna the club is long and very heavy, and the head is star-shaped; when a man is killed with one of these clubs a point is knocked off the head in remembrance of the deed.

On the northern islands the clubs are shorter and the shapes are also different; on Efate and Nguna the common club is merely left thick at the butt-end, while on others fanciful knobs are made, but on Tongoa the shape takes the form of a double-bladed battle-axe skilfully fashioned out of solid hard-wood. On Ambrim they sling the murderous weapon from the shoulder by a wrought hempen band terminating in a tassel, and on north Santo a kind of sceptre is used by the chiefs as a badge of office. On Tanna a singular stone weapon like an office ruler was used with deadly effect when thrown at a distance of twenty yards. On Futuna a similar weapon was used, but instead of stone it was ground out of coral rock. The stone axes of other days were of the world-wide wedge pattern; shell adzes were also made, but the steel axes of civilisation are now in common use.

The dwellings of the natives are for the most part rude thatched huts, with a doorway, on some islands at the end, on others at the side; in shape they somewhat resemble a huge fishing-boat turned upside down with one end sawn off. Many of the natives are now building square houses, which are much more healthy and less confined than those of the old shape; these also are covered with thatch. Many of the leading men have from time to time been induced to build limestone houses, but they soon leave them, saying that such houses are too cold to live in. They cling with great tenacity to their old style of hut, in which the smoke of the wood-fires at night, finding no egress but by the door or, to a certain extent, through the thatch, sends the mosquitos about their business, and allows the inmates to sleep.

The canoes on the southern islands are usually small and rude in construction; they are hollowed out of a single log, with an outrigger attached, and are intended to carry from two to six adults. On Futuna they have an ingenious method of heightening the sides of the canoes by building on extra pieces. They bore holes in the wood with a heated iron and sew the slabs to the body of the canoe with sennit, plugging up the holes afterwards with coco-nut fibre. On Malekula and other islands in the north the natives build huge canoes for war or trading purposes, capable of carrying from forty to fifty men, besides pigs and other articles of barter. Excellent fishing-nets are fabricated on some islands with twine or cord made by hand from the inner bark of a tree. The primitive shell fish-hooks are no longer made, as steel hooks are now so easily obtained. Fish-traps of a circular shape are made with fine split cane closely plaited together.

In the manufacture of their idols and in their idolatrous customs the natives throughout the group vary considerably, yet it is evident that one religion is common to the whole group, namely, the worship of ancestors.

To these spirits they appeal in time of war, or when sickness or distress overtakes them, and propitiate them by gifts of food placed on stones in sacred spots, or in baskets hung in sacred groves; even in drinking the intoxicating *kava* the Aneityumese used to pour out a libation to the *kava* god.

On all the islands the sorcerers are presumed to have the power of producing an abundant supply of food, of bringing rain and wind, and also of causing or preventing sickness and death. These men are both feared and hated, but can levy taxes on their dupes at will. The idols or sacred stones on the southern islands are for the most part rude and uncarved; they are of all sizes from a small pebble to a huge block many tons in weight. One such huge stone may be seen in the Ohul valley on the north side of Aneityum; it was used in connection with the worship of the sun, to which and the moon (supposed to be husband and wife) great honours were paid; it is one of the few stones on the island that have figures engraved upon it. These figures are intended to represent the sun, moon, fishes, birds, turtles and flying foxes which are very numerous there. The generation which has just passed away knew nothing about the origin of these figures, but simply ascribed them to the work of spirits. This remarkable stone is of ordinary basalt, and measures some thirty-three feet in length, by thirteen feet high, and its position suggests that it was thrown from the crater of some great volcano in a past age.

At Lilipa, near Havannah Harbour, Efate, there is a cave where, on the sides of the rock, a number of curious figures have been carved, which also are ascribed by the natives of that island to the work of spirits, and are, therefore, doubtless of considerable antiquity. On Ambrim, Epi, Malekula, and other northern islands the natives have a custom of erecting huge carved images, intended to represent their ancestral chiefs. These images are usually made out of the black trunk of a tree-fern with the butt-end upwards, the handsomely-carved human face being highly painted red and green, or black and white, just as fancy dictates. On Malekula we have seen fifty of these idols on the outskirts of a public square, with eight or ten hollowed log drums set up in the middle; also, at another end of the square, flat stone altars were erected, over which the blood of pigs killed in sacrifice is shed.

It is hard for the heathen to believe that any adult man can die from natural causes, the supposition being always that he has been bewitched, and this belief keeps up a feeling of hatred and continual desire for revenge. Both northern and southern islanders are very careful to keep all refuse of food until an opportunity occurs to burn, bury, or otherwise dispose of it—extending this practice to the skin of bananas, chewings of sugar-cane, and even cuttings of hair; for should an enemy find them, and with certain incantations burn them, the owner would sicken and die. When an important man on a heathen island dies, his friends

immediately seek to discover who has bewitched him, and another life is often taken in revenge, whence tribal warfare arises. Low down as the people are in the social scale, they yet believe in an after-life. It was customary to strangle women on Aneityum on the death of their husbands, so that having been their companions or servants here they might act in the same capacity hereafter. A fire was always lighted on the beach, in order that the spirit of the dead man might come back and warm himself, implying that the place to which he had gone was desolate and dreary. *Umaatmas*, or the abode of the dead, was believed to be in the direction of the setting sun. Cooking and eating the bodies of the enemies killed in warfare is still practised on islands where missionary teaching has not yet taken effect. Christianity on the one hand—which, besides making men good, teaches them to be industrious—and legitimate commerce on the other, improve their social condition, and are the two levers which will raise these sunken savage races out of barbarism.

The Aneityumese had a legend when the missionaries went there, that the chief *Natmas*, or spirit, called *Inhujaraing*, was the discoverer, not the creator, of the island. This great spirit was considered so sacred and powerful that ordinary people would not pronounce the name (it is said that in olden times an ordinary Hebrew would not pronounce the sacred name Jehovah)—a privilege reserved for the priests or sacred men who had communings with the spirits. *Inhujaraing* is said to have gone a-fishing in the leaf of a tree, called *Neseaing*, which grows close to the sea shore; the leaf is peculiar, being like the ball of a tablespoon, without a midrib. When the shell-fish hook was let down, it got attached to something, and, on the great spirit fisher pulling with all his might, lo! the island of Aneityum appeared. The saddle-peak mountain (which is about 2800 feet above the sea-level) rose first, on which the spirit sat, and continued his fishing until the whole island, as it now is, was above water, and at last men were formed, who became the forefathers of the present race. We can conceive a foundation for this story in the experience of Noah after the flood, when his ark rested on Mount Ararat, where there is also a saddle-like peak, and the subsidence of the water revealed the dry ground.

Another story of *Inhujaraing* recalls the fall of man, when the sentence of death was passed upon the human family. This great *Natmas* is said to have had a shell like that of a turtle, which abounds in these seas. One day, when he was absent from home, his children had the daring to pierce the shell and burn it, and for this wicked act they were doomed to die. On Eromanga, where a similar system of idolatrous worship existed, the natives had a legend which somewhat resembled the Bible story of Jonah. They said that a man once fell into the sea, where he was swallowed by a great fish, but the pieces of wood in the man's ears pricked the sides of the fish, and caused it to vomit him up, alive, but very thin and weak.

The folk-lore or legendary stories of the New Hebrideans has not yet been systematically collected. An effort in that direction is being made by Dr. John Fraser, of Randwick, New South Wales, who is now in communication with the individual missionaries on the various

islands, seeking to obtain and preserve for publication any valuable knowledge of this kind that they may possess. It needs a thorough acquaintance with the language, patient inquiry, and years of study to find out the bearings of many strange, heathenish, and idolatrous customs which are practised by the natives throughout the group, and to distinguish those which prevail on one island and not on another.

Many of the traditions and customs of the natives are now well known, but it may be that a more systematic study of their legends will lead to the discovery of a common source, from which the progenitors of the peoples came who now inhabit these numerous islands.

THE RUSSIAN KURDS.[1]

From the Russian of S. A. Yeghiazarof.

By W. A. Taylor, M.A., F.R.S.E.

Assistant-Librarian, R.S.G.S.

The Kurds are the descendants of the warlike race known in the ancient history of the East under the name of Kardukhoi, which inhabited the country now known as Kurdistan. This much is generally admitted, but with regard to the origin of these Kardukhoi two opinions have been held. Armenian historians look upon them as descended from the Medes, some of whom, on the fall of the Median Empire, were settled by the Armenian rulers in the district of Kord or Kordik (Kurdistan), from which they received the name of Kurds. Hebrew scholars, on the other hand, maintain that the Chaldeans were the ancestors of this people. This view, first set forth by Michaelis and Schlözer, was afterwards defended by Lassen and Karl Ritter. That the Chaldeans, like the Kurds, were of Iranian race is maintained by Kunik and Renan, and the latter believes that between the Hebrew Kasdim and the Greek Khaldaioi a form Kard must be assumed, from which the various forms of the name of this people were derived.

Anthropometrical records, from which to draw up an exact description of the type of the race, are wanting. In the Erivan and adjoining Governments the Kurds are generally tall; the skull is but slightly oval, the head being in childhood bound up tightly, so that the sinciput grows upwards and the frontal and occipital bones are flattened. The face is neither broad nor narrow, the complexion is dark, the nose straight, the mouth large, with rather thick lips. The forehead is narrow, and the chin inclined to be pointed rather than round. The hair grows freely, and, like the eyes, beard, and eyebrows, is black. The neck is usually long, and the shoulders broad: the palms of the hands are broad, and the fingers thick, though not very short. The feet are large, with toes

[1] Abstract of an article in the *Zapiski* of the Caucausian Branch of the Imperial Russian Geogr. Soc., vol. xiii. pt. 2.

crushed up together from wearing goatskin shoes with narrow points. The women resemble the men in type, but are more delicately formed. As a rule their hair is black, though auburn hair is occasionally seen.

The Kurds now dwell on the territories of three monarchies—the Turkish, Russian, and Persian. In Russian territory they are most numerous in the district of Surmaly, bordering on the Turkish sanjak of Bayazet and the Persian khanate of Maku, and adjacent to the province of Kars and the districts of Erivan and Etchmiadzin in the Erivan Government, where Kurds also dwell. In the district of Surmaly the Kurds number more than 11,000; in Erivan over 7,500; in Etchmiadzin above 5,500; and in Alexandrapol about 3000. Small numbers are also found in the neighbouring districts. As regards tribal divisions there is greater uniformity in the Erivan district than in the Surmaly, and whereas the villages where the Kurds pass the winter are as a rule scattered among those of the Armenians and Tartars, in the Erivan district they lie at no great distance from one another. They are situated on marshy spots beyond the river Araxes, not far from the Kara-su. By far the most numerous tribe is the Bruka, divided into three sections. They for the most part pasture their flocks in summer on the crown lands of Airija, lying partly in the Erivan and partly in the Novobayazet district. In the Surmaly district the winter quarters are mostly scattered between Mount Ararat and Mount Tandurek, on the western side of the district. The most numerous tribe is the Häsänliya Yezids. In the Etchmiadzin district the Kurds dwell on the marshy grounds of the Araxes and the Kara-su and on the slopes of Mount Alagoz. The most important tribes are the Dylkheirana and Milanla. To enumerate all the smaller tribes, some of which contain less than 100 souls each, would be wearisome; suffice it to say that the total number of Russian Kurds has been officially given as 28,421.

Each of the tribes in the Erivan Government has its peculiar dialect, but the differences in these dialects are so slight that Kurds of different tribes can freely converse with one another. The Kurds of this Government are known among themselves by the general name of Kurmanja. At the head of the tribe is a hereditary chief, or a rich man who enjoys the general esteem of his fellow-tribesmen. In some tribes there is more than one ruling family. Thus, among the Bruka there are three, and accordingly this tribe is divided into the three clans, the Nadyr-aghi, the Namo-aghi, and the Mirza-aghi. When the tribe is numerous, it is divided into small communities, each of which is governed by a chief called El-Beghi. In former times the tribal chief had full judicial power, and could punish criminals and banish them from the tribe, while the El-Beghi levied imposts and decided unimportant cases with the assistance of the elders of the community. Even up to the time of the reform of the judicial administration in Transcaucasia the Kurds retained certain privileges of self-government, and the local authorities were very seldom resorted to, family disputes concerning inheritance, etc., being usually settled by the elders, and the verdict of the head of the tribe, or of the El-Beghi, being unquestioned in civil and criminal cases. The El-Beghi had no power of inflicting capital punishment, but he could confiscate

the goods of a murderer, assigning part as a compensation to the relations of the murdered man and appropriating the remainder to his own use, or—a still worse sentence—banish the man from the tribe. A banished Kurd led a miserable existence: regarded as a stranger in another tribe, he was exposed to insult and injury, and even his life was not safe, while he had no relations at hand to assist him in his need. Now this autonomy has passed away, the power of the hereditary chief and of the El-Beghi has been abolished, and the Kurds, equally with the other inhabitants of the country, are placed under the jurisdiction of the local judges. Public security is provided for by special police commissaries for the Kurds.

The Kurds were formerly a purely nomadic people, and though of late they have shown a tendency to adopt a settled manner of life, especially in the Alexandrapol district, where many of them are enrolled among the tenants of crown lands, yet even the agricultural Kurds cannot quite break off the habit of migrating to distant pasturages in summer. These, however, return to their dwellings earlier in the year than the true nomads, and spend their time in preparing provisions for the winter and in field work. The villages are usually situated near a stream or spring, and resemble warrens rather than human habitations. The houses are half buried in the ground, the upper parts rising above it like small hillocks. In some parts the roof is level with the ground, and then only the bark of the dogs and the smoke of the fires betray their existence, especially when they are covered with snow. There is no street, but the hovels are huddled together without any order. There are no trees about these villages as in those of the Armenians and Tartars, but there are numbers of hay-ricks and huge heaps of dung-fuel. The walls of the houses are built of clay—in mountainous regions of stone—and the roof is formed of wooden beams and bundles of brushwood. One or more openings are left in the roof to admit light and air into the rooms. On winter nights these are closed with bundles of hay. As a rule the house contains only one room, but among the wealthier Kurds it often consists of two or three: one is appropriated to the use of the women and children, another to the men, while the third is a storeroom, where are deposited cheese in leathern bottles, provisions of all kinds, and the tent with its poles, ropes, and other appurtenances. Sometimes the tent is stretched over the roof to keep it dry. Beside the house stand the sheep-pen and stalls for the cattle, which are entered from the house. Along one side of the room is built a platform of mud or stone, on which are piled large saddlebags, carpets, felt-rugs, and cushions, covered with fine woollen rugs of elegant patterns. In the opposite wall is the chimney, when there is one. In the centre of the apartment a hearth is formed of three stones. At night preparations for sleeping are made by laying felt mats on the floor, on which are placed cushions, stuffed with wool, and woollen rugs (*palassy*) to serve as blankets.

Life in winter is monotonous: the men spend almost all their time in idle gossip, while the women mind the house, weave fine woollen rugs and coarse carpets, spin wool, and knit stockings. The women are

remarkably industrious, and they teach their daughters all they know themselves. To be unable to weave and knit is a disgrace to a Kurdish woman.

The return of spring, when, with the annual migration, a new and freer life begins for the Kurds, is waited for with great impatience. Before starting they form associations (*obä*), each consisting of eight to twelve families. The command is taken by an aga, or a rich man, who engages and maintains shepherds for his flocks and herds; the other members of the community join their herds to his, paying him four or five sheep or goats out of every hundred. Should the head of the *obä* be unable or unwilling to incur the expenses involved, he may share them with one or more partners. The community has a thoroughly democratic character: all the members, poor as well as rich, enjoy the same rights. The head of the *obä* is simply *primus inter pares*, and his authority is based solely on his personal qualities. If he be a capable man he is generally respected, and his decision in any dispute that may arise is unhesitatingly accepted by both parties. He has the right to dismiss an intractable man, but should he, without sufficient grounds, expel a desirable associate, he runs the risk of being deserted by all. At the end of the season the *obä* is dissolved, unless the head possesses a winter pasture, and the members are satisfied with him and with each other, when it may be continued through the winter under the same conditions as during the summer.

Having formed their associations, the Kurds proceed in spring to a *yurt*, where they stay for the lambing season, and then, when the lambs and kids are strong enough to travel, and the hills are free from snow and covered with grass enough to feed the cattle, they migrate to another *yurt*, where they pass the whole summer. The night before the journey, at sunset, they take down their tents and pack up their goods. At cock-crow they set forth, each family forming a separate detachment. Women, children, and old people usually ride, while the boys, girls, and men follow the baggage animals. On arriving at the *yurt*, each family sets up its tent on a site reserved especially for it as long as it remains in the community. These tents are black, and are woven out of goat's hair. They vary in length from five to thirty, and in breadth from five to fifteen, paces. Posts in one to five rows of three each support the covering. The front is open, while the back and sides slope downwards to a fence of closely interlaced twigs, four feet long and as thick as the finger, and are fastened by ropes to pegs in the ground. The height of a tent is usually about twelve feet. Large tents are made in two parts, being too heavy for one ox to carry. At the back of the tent are piled up the carpets and rugs; in the front stands the hearth. On one side are two enclosed spaces, which serve as a larder and a receptacle for pots and other kitchen utensils, respectively. On the other side is a pen, where lambs are kept until they are strong enough to pass the night outside.

The term *yurt* denotes the ground on which a tent is pitched, but in its more extended application it embraces all the meadows and pastures in the occupation of an *obä*. No individual can appropriate to his private use any part of those lands, except the ground on which his tent is

pitched. Occasionally a small part is reserved for the horse of the chief. The *yurt* remains in the hands of the chief as long as he is rich enough to keep the herdsmen. Should he sink into poverty, it passes to another master. If, however, he again attains to affluence, he may lay claim to be reinstated in his former position, and the disputes that often arise in such cases frequently lead to violence, and even murder. The boundaries of the *yurt* are clearly defined, and cattle of another *obä* are rigidly excluded. To this rule there are two exceptions. On their wanderings the men of an *obä* may stay with their cattle on a *yurt* that lies on their route for the space of twenty-four hours, or three days at most; and, secondly, cattle may be driven to water across an adjoining *yurt*. The *yurts* are generally situated near streams or springs, and those are preferred which lie on the northern slopes of mountains, where the grass keeps green for the greater part of the year. The Kurds thoroughly enjoy themselves on these mountain pastures. In the early morning and at twilight is heard on all sides the sound of shepherd's pipes, and in the evening the young people sing and dance up to a late hour. The principal occupation is sheep-rearing, and some men own flocks of 1500 or more. They supply a variety of products: the full-grown sheep yield butter and cheese, and the wool is worked into carpets and rugs, stockings, and other articles. Sheep are shorn in July, and lambs in August; one-year-old sheep twice, at the beginning of May and in August. Wool of lambs and from the second shearing is made into felt. Goats, which yield hair for tents, are kept in small numbers, and of oxen, cows, and horses only sufficient to provide for the wants of the household, to carry baggage, and for riding.

The winter pastures are managed in the same way as the *yurts*. The flocks and herds of the community all graze together. They are supplied with forage only in severe winters, when very deep snow prevents them from moving about and feeding themselves. Then each man takes his sheep and goats to his own dwelling. As a rule the flocks are folded at night, and are turned out to the pastures every morning. The meadow lands are divided annually, either among the men by lot, each one mowing his own portion, or groups are formed, who mow their parts and divide the hay among themselves.

The Kurds live very simply, their food in spring, summer, and autumn consisting of curds, cheese, and sometimes milk porridge. They are very fond of meat, but grudge killing a sheep or goat from their own flocks; only on high festivals or to entertain an honoured guest will they spare one of their own animals. Occasionally, during their migrations, they contrive to steal from their neighbours, and convert their booty into dried meat for winter consumption. Made dishes are almost unknown; the meat is boiled, or roasted in the ashes. A dish is also made of mince, warmed in a large round pan, mixed with curds, and flavoured with garlic. In winter, particularly during Ramadán, somewhat richer living is indulged in; pilau and other dishes are prepared. The favourite vegetables are turnips and onions. The Kurds eat three meals a day—in the morning, at midday, and in the evening. The chief meal is at night, when stolen meat can be cooked with less risk of detection.

The Kurdish dress is somewhat original. Over a *krass*, or shirt of cotton cloth, is worn a *patch* or *khaftan* of Asiatic material, with wide sleeves and slits over the hips. It descends to the knees, and is girded round the waist by a belt or scarf. Over all is worn a coat (*tchukh*), either long like a Tartar's, or coming down only to the waistband, where it is adorned by a party-coloured fringe. The sleeves are slashed, the edges hanging loose or fastened together with strings. Some persons of importance wear a *tchukh* of red cloth. Drawers of long-cloth or coarse calico, gradually narrowing downwards, are worn under loose trousers of coarse native woollen material, rarely of silk. The women's underclothing does not differ greatly from that of the men. The chemise of printed calico, or long-cloth ornamented with patterns in red, descends only to the hips and has wide sleeves that can be turned up when the wearer is at work. On festival days the women wear above the *khaftan* a voluminous *dalma* of red silk, open in front and ornamented with silken ribbons and fringes. They also wear wide aprons fastened with coarse woollen strings, which supply the place of a waistband. Sugar-loaf hats of felt are the usual covering for the head. Adults and old men wrap coloured kerchiefs round them, giving them the appearance of turbans. Amongst the wealthy a fez with a silken tassel is used, and Kurds living among Tartars and Armenians frequently adopt the sheepskin hat. Women wear more elaborate head-coverings. Girls sew a wooden hoop into the crown of the fez, which is thus stretched out tightly to form a kind of platform. In the front is stuck a pin with red beads attached. Under this a yellow silken kerchief is wound round the fez, and over the kerchief a black ribbon. At their marriage girls put over this head-dress a three-cornered piece of white cotton material. Two ends are passed under the chin and fastened at the crown, while the other hangs down at the back and ends in a black tassel. Older women wrap kerchiefs round the head, wearing the three-cornered piece of cotton over all. Bead necklaces, earrings, rings of gold, silver, and bronze, and small round silver nose-rings, are the chief ornaments. Men and women wear shoes of the same pattern. Rich men have sometimes Asiatic boots with low broad heels, and some women wear broad shapeless boots of yellow morocco, and, in some parts, *tchusty*, or Turkish slippers.

Though fire-arms are now widely distributed among the peoples of the East, and even among the Kurds, still the latter cling to their primitive weapons. A Kurd never stirs abroad without a club bound with rings of metal, which he can use with great dexterity both in attack and defence. The women also are not unskilled in the use of this weapon. Scimitars, daggers, round shields, carabines, and pistols are also found among them; guns are rarely seen. Horsemen sometimes carry a lance more than 9 feet long. Kurds fight very well with clubs and daggers, but are easily scared with fire-arms. When the enemy takes aim at them they turn tail, crying out 'Run, a bullet is coming.'

The Kurdish household consists of the father, mother, the sons and their children, and the unmarried daughters. The father is the absolute lord and master of all the members of his family. The wife can do nothing without his permission. He has the right to beat her cruelly,

and, in case of conjugal infidelity, the custom of the race gives him the right to cut off her nose and ears. On Russian territory this barbarous punishment has fallen into disuse under the influence of the Government, but there is good reason for believing that it is still practised among the Turkish and Persian Kurds. Equally unrestricted is the power of the father over his children; sons and daughters who do not submit to the will of the father lose the respect of the community. The father has the right of sending his sons out to service; he may in his lifetime make a distinction between them, giving more of his property to one than to another; he may beat his son and expel him from his house and cut him off from his inheritance, leaving his property to a relation or even a stranger in blood; but he has not the power of life and death. Murderers of sons, equally with parricides, are shunned by all. No one will give them bread and salt. The murder of a relation brands with disgrace not only the perpetrator but all his kin. As regards daughters, the father can dispose of them in marriage without consulting their inclinations. He has also the right, in certain exceptional cases, to annul the marriage. When a member of the one family has murdered one of the other, the father may demand a divorce, unless the feud be settled and the parties reconciled; and, if the son-in-law proves to be a worthless fellow and frequently maltreats his wife without a cause, her relations may dissolve the union. This practice has the appearance of a safeguard, but divorce in such cases is very advantageous to the father, who, restoring to the husband a fixed part of the price paid by him, can dispose of his daughter to another man, and receive a second payment. While the customs of the race give the father such unlimited control over the members of his family, at the same time they lay upon him certain obligations. Not only has he to educate and provide for his children, but he has also to protect their interests and honour. The judges of the tribe deal with him alone, and should the son commit murder or theft, the father is bound to give compensation; he cannot throw off his responsibility by leaving his son to the mercy of his enemies. But when corporal punishment is inflicted, or when the criminal falls into the hands of the ministers of justice (the Kurds generally try to settle their disputes quietly among themselves), then the responsibility falls entirely on the son. The father is also obliged to provide his son with money to purchase a wife, and to give his daughter a dowry on her marriage.

The mother has only the moral influence of a housekeeper; even after the husband's death she is to a great degree dependent on her son. If she sees that her daughter is clever and orderly she hands over to her the management of the house, that she may gain experience and become a good housewife. For the rest, it may be said that the sons take precedence of the daughters and the eldest son of his brothers.

As householder and proprietor, the father manages and disposes of the whole property of the family. Theoretically, the wife has her own private property, the offspring of the cows and mares given on her marriage by her relatives, but really the husband deals with it as he pleases. So also the sons, as long as they remain under the paternal roof, have no separate property except their weapons and riding horses. They

take their share in the management of the flocks and herds, but rarely sell or buy cattle without the consent of the father. It should be mentioned, however, that though the father is empowered to drive his son from the house, disinherit him, and, if he pleases, act as a domestic tyrant, such conduct is of rare occurrence, and in general all the members of the family live together in harmony. When old age comes on, the father hands over his property to his eldest son, who takes upon himself the entire management, resorting to his father for advice only in cases of exceptional difficulty.

Households descended from a common ancestor constitute a clan known by the name of *tayra*. In this are included relations on the female side to the second or, at most, the third generation. As long as the memory of a common origin survives, it forms a close bond of union between the members of the clan, who in times of trouble zealously defend one another. But of definite family obligations there remain only guardianship of children and the avenging of blood. When a man dies leaving young children, the duty of providing for them falls first on the father of the deceased, then on the brother, the grandfather, the cousins on the father's side, etc., according to the closeness of the relationship. If the man leaves a widow, the duties of the guardian are confined to a supervision of the household and property, but if the wife be dead the guardian takes possession of the children and their property until they are of an age to keep house for themselves.

The avenging of murder and lesser injuries is a sacred duty to the Kurds. They observe the *lex talionis*, "an eye for an eye and a tooth for a tooth," and endeavour to kill a murderer, and to appease the injured honour of one of the clan by a similar injury. The part of avenger falls to the lot, first of the father and brothers of the murdered man, then on the cousins, grandfather, etc., in order; but other members of the clan must not let the murderer escape should he come in their way. When, too, there is no relation capable of exacting the penalty, the duty of vengeance falls on the whole clan, and frequently two clans are thus involved in a feud which is prolonged through more than one generation. A custom also prevails, which to some extent has the effect of reconciling the hostile parties, and prevents bloody quarrels from breaking out—namely, the payment of blood-money. After a murder has been committed, the elders of the community assemble, and fix the sum to be paid in compensation, taking into consideration the circumstances attending the murder—whether it was a case of manslaughter or premeditated homicide—and also the value of the murderer's property. The compensation for homicide is usually £10 to £50, for the loss of a hand £4 to £15, for an ear £2 to £6, and for an eye £7, 10s. to £20. The life of the offender is not, however, fully guaranteed by the payment of compensation. The spiteful Kurd never forgives his enemy on this side of the grave; he does not, indeed, openly pursue him, but he cherishes his enmity in his heart, until a favourable opportunity occurs of redressing the wrong.

Written wills are unknown among the Kurds. The son or grandson

is considered the legal heir, unless the father has during his lifetime bequeathed his property to another. The son, for his part, never renounces the succession, even though the debts of the father exceed the value of his property. The verbal directions of the father are carried out most punctiliously by his relations after his death. In the absence of such directions, the division of the property is regulated by precise laws. The members of the family take precedence in the succession according to the category to which they belong. These categories are three:—the first including the son, grandson, wife, unmarried daughter, and son's daughter; the second, the father, brother and his sons, the grandfather and cousins on the father's side; and the third, more distant relatives. The eldest son takes the tent and hut, and the rest of the property is divided among the children, a son receiving twice as much as a daughter. If there be a widow, she receives first an eighth part of the property, which she hands over to one of her sons, with whom she lives, and the unmarried daughters dispose of their shares in the same way. The brother is bound to give the sister who lives with him a dowry on her marriage, and should the widow marry again, she similarly receives a marriage portion. Should heirs of the first category fail, the property passes to those of the next degree, and is in that case also divided according to fixed rules. If a man possesses no near male heirs, he may adopt a distant relation, or, in default of such, a stranger in blood.

Kurdish women are remarkable for their vigorous constitution. Although there are many experienced midwives among them, they are not always called in at a birth, and during the migration the mother rides on with her family the very next day, exposed to rain and snow, and passes the night in the open air. On the seventh day the advent of an addition to the family is celebrated. The midwife, or some other woman, carries the child three times round the hearth, and throws the umbilical cord into the fire. It may here be mentioned that the hearth is a sacred place to the Kurd. He will not spit in the fire, nor pollute it by throwing refuse into it, and on solemn occasions he swears by it. In spring, care is taken that the fire shall not go out, for fear that the cows should cease to give milk and the lambs be blind. When the son sets up a separate establishment, he lights his fire from the paternal hearth, and the daughter, on her marriage, walks round it, as though to take leave of it. To return to the new-born child. After the ceremony already mentioned, a name is given to the child. The midwife then presents it to the parents, and receives a present. Male children are not circumcised soon after birth; sometimes months and even years elapse before this rite is performed, and occasionally adults are still uncircumcised, but to such certain disabilities are attached—meat killed by them is considered unclean. Young children are left to the care of the mother, and at seven or eight years of age begin to take part in the work of the household and in tending the stock. Youths are employed as shepherds, beginning with a small flock, and, after acquiring experience, receiving charge of a larger flock and higher pay. When the father is a man of property, the son feeds his flock. Young men frequently leave their

home, and take service in another part of the country and with another tribe, returning after a few years with a small flock of sheep and goats, acquired partly by their labour and partly by theft. Girls are instructed by their mothers in the processes of carding and weaving wool, and in other domestic duties. In summer, they assemble after dinner by the side of a stream, under a rock or shady wood, and sing in chorus, while they spin wool or knit socks. There, too, the young men form their choruses, but apart from the girls, unless there are no young children present to tell tales at home. On moonlight nights young men and girls meet and dance before the tents, under the eyes of the mothers. It is then that matches are often made, and, though to act against the will of the parents is considered a crime, it sometimes happens that a young couple elope, and return to the father's house after a reconciliation has been effected. Craftiness, breach of faith, and treachery are instilled into the young Kurd by the conversation and example of his elders. It must, however, be admitted that there are men among this people of irreproachable honour. But public opinion charges a man with effeminacy who has never stolen a sheep, ox, or horse. Old men have been heard to give the following advice to the rising generation:—"Steal the property of the Tartars—that is no sin: pray to God five times a day, eat meat stolen from the Tartars, and in all things conduct yourselves so that you may enter heaven after death." In fact, the Tartars suffer severely from the thieving propensities of the Kurds. Religious differences are probably the cause of this antagonism, the Kurds being Sunnites and the Tartars Shiites. After the theft the Kurds exhibit considerable ingenuity in the concealment of their booty. For instance, they have been known to lower the tent over the carcasses of stolen sheep, as is the custom on the death of a member of the family, and wail around it as for a dead person, whereupon the Tartars who had come in search of their lost property passed on without uttering a word. The extent of these depredations may be gathered from the fact that in one summer an *obá* of fifteen families stole more than ten oxen and buffaloes and thirteen sheep and goats. Though hospitality is considered a sacred duty, Kurds have been known to murder a guest for the sake of a few shillings. In moral character the women are far superior to the men. They are, as a rule, faithful wives, industrious housekeepers, and tender mothers.

Polygamy is, of course, allowed among the Kurds as Mussulmans by religion, but they are disposed to monogamy, and divorce is not common among them. The chiefs of the tribes have sometimes two wives, but most Kurds are not able to maintain the children of more than one. They usually marry between the ages of fifteen and thirty. Sometimes a man procures a wife by carrying off a girl, but should her relations overtake the runaway couple, the man is killed, and the girl also if it appears that she has gone off of her free will. But should they succeed in reaching a place of safety, the husband employs a friend to conciliate the parents of the girl, and, when the negotiation is brought to a satisfactory conclusion, he pays a higher price for his bride than under ordinary circumstances. When it is known that the parents of the girl are not

averse to the match, a go-between is sent to them to ask their consent, and, this being granted, the father of the bridegroom with some of his relations goes to arrange the price of the bride, and, after all preliminaries are settled, makes a formal demand for the hand of the girl. Her father responds by promising, in the name of God, the Prophet, and Fatima, that he will give his daughter to the son of the suitor. Then bread and salt are distributed among the relations of the betrothed couple, and one of the guests hands a gold or silver ring to the mother, who places it on the hand of her daughter. All the guests give presents to the bride according to their means. Some time after the friends of the bridegroom meet again at the house of the bride, and spend the day in feasting and amusements, the bride herself being absent. After the betrothal the bridegroom may visit the bride, but months, or even a whole year, pass before the marriage takes place. The price paid to the relatives of the bride is from 10s. to £5 of ready money, 10 to 60 or 100 sheep or goats, 1 to 5 oxen, and a horse with saddle and bridle. Besides this, on the day when he gives his consent to the marriage the father receives a gun or pair of pistols and 10s. to £2 in money. The presents a man gives his bride consist of carpets, bedding, stockings, and other woollen articles, and are worth from £2 to £8. Should the wife, after a time, leave her husband and return to her father's house, a part of the purchase-money, never exceeding two-thirds, is restored. On the wedding-day the bridegroom invites his friends, and they dance till dinner-time, after which they set out to fetch the bride. Games and singing occupy the rest of the day, and in the evening, or the next morning, the *mulla* performs the marriage ceremony.

At a death the Kurds weep and wail, the women especially giving way to violent expressions of grief, tearing their hair and scratching their faces. On the arrival of the *mulla* the body is washed in cold water, wrapped in a shroud, and carried to the grave, preceded, if the deceased be a rich man, by his horses saddled and bridled and bearing his weapons. According to some Kurds a piece of money and a club are laid in the shroud; should the deceased fail to bribe Gabriel with the money, he fights his way into Paradise with the weapon. At the grave the *mulla*, turning to the corpse, addresses to it words of farewell, and exhorts the spirit to answer boldly the questions that will be put to it by the angels concerning its past deeds. The body is then buried with the face towards Mekka. Monuments are only erected by the wealthy, and epitaphs are scarcely ever seen. A heap of stones marks the grave, and women frequently cut off their hair and fasten it on a stick, which they place at the head of the grave of a husband or brother. The spirits of the dead, according to the belief of the Kurds, act the part of intercessors with Allah and the Prophet, beseeching them to extend their favour to their descendants and to grant them prosperity. Therefore, on the annual festival of Bairam, they proceed to the graves and hold a feast in honour of their deceased relatives; also, a few days or a week after the funeral a feast is held at the grave, for until this honour has been paid it is believed that the deceased cannot rest in peace.

The religion of the Kurds is Mohammedanism, but they have no clear

idea of its tenets. Even the *mullas* and *sheikhs* do not understand its precepts: they know a few prayers and can read the Koran, but are quite incapable of explaining it. Hence, in the religious beliefs of the Kurds Islamism is corrupted by the grossest superstition. God is not in their eyes a perfectly holy Being, but one who takes an interest in human vices. They pray to Him for assistance in murder and theft. They also believe in a multitude of evil spirits, and the *sheikhs* are called in to act the part of exorcists in case of sickness or other calamities.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A., F.R.S.E.,

Assistant Librarian, R.S.G.S.

EUROPE.

Sunshine in the British Isles.—The first sunshine recorder was the invention of Mr. John C. Campbell of Islay, and consisted of a hemispherical bowl, in which a spherical glass ball stood on a low pedestal. As the sun passed across the sky, its rays, concentrated by the ball, burned a groove in the side of the bowl. With this instrument the amount of sunshine during six months was roughly recorded, and the character of individual months was fairly shown, but the grooves of two successive days could not be distinguished from each other, the change in the sun's declination being very slight. Slips of cardboard were afterwards substituted for the wooden bowl; and in the present form of apparatus, devised by Sir G. G. Stokes, three brass grooves, concentric with the spherical lens and adjusted for the latitude, hold the cards for summer, winter, and the equinoxes, respectively. The cards are changed daily at sunset. This instrument is not without defects. When the sun is low it ceases to act, and at all times the slightest film of cloud, hardly visible to the eye, is sufficient to check the burning power of the sun's rays. Photographic processes have been devised by Mr. Jordan, Professor M'Leod, and others, but they are less easily managed. The Stokes-Campbell instruments have been in use since 1880, and the Meteorological Office has issued a report on the sunshine recorded during the years 1881-90. The sunniest spots in the Kingdom are the Channel Islands, which enjoy sunshine during 39·9 per cent. of the time the sun is above the horizon in the course of the year. Falmouth shows the next highest record, 35·7 per cent., and along the whole coast of England from Milford Haven to Yarmouth there is no great variation. The coast naturally receives more sun than inland districts, where clouds are formed by the hills, and in towns the percentage is low owing to the smoke. As regards the monthly means, it is found that in Jersey alone does the sunshine ever attain to half the amount possible; 52 per cent. is the value for May and 55 for August. Geldeston, in Norfolk, follows with 48 per cent., and the eastern coast as far north as Aberdeen is decidedly sunny. Ireland and the west of Scotland have persistently cloudy skies in summer and early autumn, but in late autumn Ireland is particularly favoured by the sun. On the other hand, from some unexplained cause, there is a deficiency of sunshine in Jersey during November. The sunniest month in the ten years was May 1882, when thirty-three stations registered at least 50 per cent. June, July, and August, 1887, were also very bright. The highest monthly amount entered, 68 per cent., was recorded at Falmouth in June, and in Jersey in August of that year.

The Great Skua in Shetland.—In the last number of *The Annals of Scottish Natural History* (Part 2, vol. i.) Mr. Eagle Clarke reports upon the haunts and numbers of the Great Skua (*Stercorarius catarrhactes*, Linn.), or Bronxie, as observed in the Shetland Islands during last year. On Foula sixty young birds were reared, in spite of considerable nest-harrying, which, it is to be regretted, still goes on. On Unst Mr. Edmonston, the proprietor, took special care to preserve both birds and eggs, stationing a keeper at Hermanness to guard this favourite breeding-place by day and night, and distributing strict orders against trespassing in the neighbourhood during the months of May, June, and July. He notes the interesting fact that one pair of birds established themselves at Saxavord, an old, but abandoned, haunt of the Skua, another pair building their nest at Sneuga, places outside Mr. Edmonston's estate. Both these nests were robbed, but the seven pairs of birds which settled at Hermanness successfully reared their broods in perfect safety. The Skua appears to keep closely to its station during the breeding season, Mr. Clarke, during a month's cruise among the islands in 1890, having failed to see one, except at the nesting-places they had chosen.

The Coal Mines of Germany.—*Globus*, Bd. LXI. No. 18, states that in 1881 the number of mines worked was 497. These gave employment to 186,335 workmen, who extracted nearly 48 million tons. In 1890 the number of miners had increased to 262,475, and the output to 69 million tons, though only 425 mines were exploited. In this production Germany takes the second place, after Great Britain, which produced 181½ million tons in the same year. France comes next with 26 million. The most important coal-field is the Rhenish-Westphalian, extending from Hamm to the neighbourhood of Crefeld. It yields more than half the total supply. The other fields lie in Upper Silesia on the Russo-Austrian frontier, in the basin of the Saar near Saarbrücken, in Saxony between Zwickau and Chemnitz, in Lower Silesia between Charlottenbrunn and Landeshut, and in Upper Bavaria near Miesbach, Penzberg, and Unterpeissenberg.

ASIA.

Climate of the Persian Gulf.—At certain points on the Persian Gulf the climate is almost unbearable by Europeans, and very detrimental to their health. In Bushir the maximum temperature is 104° F. in summer, and falls to 50° in winter. There is scarcely any difference between day and night temperatures, and the air is always saturated with moisture. At Muscat the dark colour of the soil promotes the storage of heat. Here, also, the maximum shade temperature is 104° F., the minimum being 54°. In the sun the thermometer sometimes rises to 176° F., especially in September and October.

Johore.—Dato J. Meldrum of Johore has sent us a few particulars concerning the population of this principality. The estimated population in Johore and Muar, in 1892, is about 200,000, of whom 35,000 are Malays, 150,000 Chinese, and 15,000 Javanese. There are also 37 Europeans and a few natives of India, Japan, etc. The Malays are decreasing in number, while the Chinese are increasing. The latter are chiefly engaged in the cultivation of gambier and pepper. For the last twelve months a party of British engineers in the service of the Sultan has been surveying the country for a railway. Mr. Meldrum advocates the construction of a line through the Malay Peninsula and Burma to Calcutta.

Commerce of Bangkok.—The French Consul-General remarks on the great development that has taken place during the last ten years in the trade of this port (*Rapports Commerciaux*, No. 2, 1892). Whereas from 1881 to 1886 the annual

value of the imports and exports oscillated between 2½ and 2¾ million pounds sterling, in 1888 it had risen to about 4⅛ millions, and in 1890 to over £5,606,000. As regards the imports, the larger figures may in part be attributed to a more accurate estimate of the value of goods passing through the custom-house, but the exports are composed of products the quantities of which are exactly determined. It seems, moreover, certain, from the continual rise in the price of commodities and the general air of prosperity observable throughout the country, that the circulating capital is yearly increasing. Shirtings, white and unbleached, are among the most important articles of importation, and come almost exclusively from Great Britain, while printed calicoes are supplied by Germany and Switzerland. A large proportion of the shirtings are dyed in the country by Chinese, the colours most in demand being black, violet-black, indigo-blue, and yellow for the Buddhist priests. The importation of cotton cloth for *langutis* and *sarongs* has fallen off in consequence of the deterioration in the quality. The competition between Switzerland, Germany, and Bombay has reduced the price, and the defects in the material, and especially in the dye, have not escaped the notice of the natives, who prefer cloth woven at home with thread imported for the most part from Great Britain. Germany has paid particular attention to the manufacture of copper and brass goods suitable for sale in Siam ; oil is imported chiefly from America, though Batum also shares in the trade ; and opium, the trade in which is a government monopoly, is brought from Benares.

Four-fifths of the total value of the exports represent rice. During the past ten years the exportation has doubled, and is far from having attained its limit. At present only lands close to watercourses and easy of access have been cultivated. When new canals are made and new routes opened up, extensive fields now uncultivated will be covered with crops. The Siamese cultivate little but rice and fruit. Cotton, sugar, and pepper are grown to a small extent by Chinese. The exportation of cattle fell from 35,360 head in 1889 to 21,541 in 1890.

The number of vessels which sailed from the port of Bangkok in 1890 was 477, the total tonnage being about 394,000. Of these British vessels formed 67 per cent., both in number and tonnage. The trade takes the direction of Singapore on the one side, and of Hongkong on the other. The manufactures are of little importance. There are a few rice-mills, steam saw-mills, factories for machinery, and shipbuilding yards.

Tong-king.—Coal is being worked in the island of Ké-Bao, which has been conceded by the French Government to M. Jean Dupuis. In January last the output was about 148 tons a day. The *Revue Française et Exploration*, April 15, predicts that before long British traders in coal will be driven out of the market, not only in Tong-king, but in the whole of the Chinese Sea. A Decauville railway has been constructed across the island of Ké-Bao. A steam-tug and eight barges, capable of holding nearly 100 tons each, are employed to transport the coal to Hai-Phong, 70 miles distant. At the northern extremity is a port, well sheltered from the winds, and having a depth of 23 feet at a very short distance from the shore. It has been chosen by the authorities as the naval port of Tong-King. Ké-Bao possesses summits of which some attain to a height of 1300 feet. The air is pure, and the climate healthy.

Formosa.—Lying between 21° 53′ 30″ and 25° 8′ N. lat., this island extends into the Tropics. Its length, from north to south, is about 235 miles, its greatest breadth is 136 miles, and its area 1498 sq. miles. Its population numbers about 2½ millions. From north to south runs a range of mountains, a continuation of a line of elevation which, commencing in the mountains of Kamtchatka, traverses

the Kurile Islands, Japan, and the Liu-kiu Islands, and extends through the Philippines to Borneo. In Formosa the central mass is composed of granite, which in Mount Morrison rises to a height of 13,000 feet, and may perhaps attain to even greater elevations at other points. Volcanic formations—as trachyte—are also found, and warm springs, solfataras, and frequent earthquakes prove that the subterranean fires are not yet extinct. More thorough exploration of the range, called Ta Shan by the Chinese, might lead to the discovery of active volcanoes. The low coast-land being broader on the western than on the eastern side, the rivers are there somewhat larger; but rapid changes of level, whirlpools, rapids, and shallows, render them useless for navigation. Sulphur is obtained from the solfataras, and near Kelung and elsewhere coal-mines of some importance are worked: otherwise the mineral wealth of the island is still unknown. Good timber and camphor trees grow in the woods, and spices grow wild or are cultivated. The Chinese have introduced rice, maize, millet, sugar-cane, the paper-mulberry, and many kinds of fruit trees, all of which flourish, as there is a great variety of climate. The fauna of the interior is almost unknown. Deer and wild boars are numerous, and apes (*Macacus speciosus*) are plentiful.

Whether the original inhabitants of the island were Papuans is not yet proved, but there are good grounds for believing that such was the case. The Malays, who to the number of 30,000 inhabit the east of the Island and the inaccessible mountain valleys of the centre, exhibit such peculiarities in physical formation and language as suggest a mixture of Papuan blood. They seem almost incapable of acquiring civilised habits, are divided into small clans which are constantly in feud with one another, and are practically independent of the Chinese. Their number, owing to these internecine quarrels and the gradual encroachment of the Chinese from the west, is yearly diminishing, and doubtless this race will in a few generations totally disappear. The Malayo-Chinese half-breeds adopt the mode of life of the Chinese, as also do a few of the Malays; but the latter never acquire more than a varnish of Chinese civilisation. Liu-ming-chuan, the present governor, has received a European education, and is convinced of the necessity of reform in China. He has, therefore, made in Formosa the experiment of introducing European civilisation among his countrymen. Tai-ge-fu, the new capital which he has founded and connected with Kelung by a railway, with its broad streets and neat brick houses, has little of a Chinese character. European machinery is introduced from Great Britain and Germany. The defences of the island have been strengthened, and cannon balls and cartridges are manufactured at Tai-ge-fu in a well-appointed arsenal, which is under the supervision of Count Butler, formerly in the Bavarian army. The largest town on the island is Tai-wan-fu in the south-west, containing 100,000 inhabitants, who do a considerable trade. The harbours of Takao in the south and Tamshui in the north are also open to European ships. The most important harbour for imports is Banka, on the Tamshui river, a town of 50,000 inhabitants.

Japan: Agriculture and Commerce.—*La Geografia per Tutti*, Anno II. No. 5, contains a few notes extracted from the *Report of the Statistician*, Department of Agriculture, Washington. The soil of Japan, though varying considerably in its nature, is on the whole well suited for agriculture. Under a dark vegetable earth, extending to a depth of as much as ten feet, lies a strong clayey subsoil, impregnated with salts more or less favourable to the growth of vegetation. The application of manures containing potash causes all field-products to grow with great luxuriance, and the utilisation of the refuse of cities, combined with an abundant supply of water for the purposes of irrigation, renders the fields in the neighbour-

hood of the great centres of population extremely prolific. The land of the country is divided into public and private property. To the first class belong the sites of palaces and public buildings, estates of members of the royal family, and lands which are devoted to some public service. A cadastral survey completed in 1889 showed that the area of lands of this class was 17,508,880 acres, while private estates, to which must be added uncultivated tracts, forests, etc., covered 33,870,443 acres. The implements of husbandry are very primitive : the Japanese plough is very small, and has only one stilt ; threshing machines have been introduced in the last few years. One or two horses—often, indeed, only an ox—are employed in ploughing and transporting the produce. All the valleys and low-lying lands are occupied by rice-fields. The rice of finest quality is produced on the fertile plains watered by the Tonegawa, in the province of Shimosa, where the fields cover 20 to 25 per cent. of the surface. In 1889 the quantity of rice exported was 685,657,326 lbs., besides which a much larger amount was used in the manufacture of *saké*, or ground into flour for home consumption. Next to rice the most important crops are wheat and barley, which form more than half the food of the lower classes. All kinds of vegetables are grown, particularly beans and sweet potatoes.

In 1891 there was a falling off of 25 per cent. in the imports, and an increase of 40 per cent. in the exports. The former is accounted for by the diminished imports of yarn, manufactured goods, metals, and miscellaneous articles, while the latter is due mainly to increased quantities of silk and rice sent abroad. These figures should, however, be received with caution, seeing that the percentages for the port of Yokohama, as estimated by the Chamber of Commerce and by the Custom House respectively, show a great discrepancy. The increase of the total foreign trade last year was only 3 per cent., but during the last ten years it has amounted to 113 per cent., and the extended cultivation of the mulberry and the important developments in coal and copper mining, etc. give reason to expect continued progress.

AFRICA.

Egyptian Railways.—Encouraged by the budget surplus, the Egyptian Government has decided to extend still further the railway of Upper Egypt, which will soon be completed to Girgeh. It was intended to construct a section 96 miles long, but the Administrative Council of Railways considers that the broad gauge is unnecessary in a country so thinly populated, and that with the sum set aside for the expenses of the construction, £800,000, a narrow-gauge railway might be carried beyond the First Cataract, or even to Wadi Halfa. This place is the point of departure of a line projected twenty years ago to establish communication with the country above the Fourth Cataract. Over 33 miles of this line are opened to traffic, and the embankments have been completed for 29 miles more.—*L'Afrique*, April, 1892.

Zanzibar.—Mr. Gerald Portal refers in his last report to the weakness of the financial position of the islands of Zanzibar and Pemba, where the market is capricious and cloves are almost the only crop. The Arabs learned many years ago that slave- and ivory-hunting and clove-growing were the two most profitable undertakings in Zanzibar. But the slave-trade is doomed, and when the supply of slaves ceases the clove plantations will yield only a very small profit. Mr. Portal prophesies that in the course of a few years a great quantity of land will pass from Arab into Indian and European hands, and suggests the introduction of new forms of cultivation, such as pine-apples, tropical fruits, sago, coffee, etc.

Many thousands of acres of fertile soil are still lying fallow. A ridge of hills, never rising above 500 feet in height, runs through the island from NNW. to SSE., and divides the fertile part on the north and west from a stony district on the south and east. The latter is studded with bare sandstone rocks, the interstices being filled up with sharp coral and a very scanty deposit of soil. Here are grown most of the chillies that are exported, and aloes would no doubt flourish.—*The Times*, March 14.

Madagascar.—In 1891 M. Henri Douliot made several journeys in Madagascar, a narrative of which is published in the *Annales de Géographie*, April 15th. Skirting the shore from Nossi Bé, M. Douliot sailed to Nosy Miandroka in the delta of the Morondava river. The ground is sandy and is clothed with the *satra* palm, the fruit of which yields an inferior kind of spirit, while its leaves are made into ropes. The tidal water ascends a considerable distance up the river though the current is rapid, and supplies salt to the numerous mangroves which grow along its banks. Turning northwards, M. Douliot passed the mouths of the Marofototse and another large river, the Andranomena, and the delta of the Tsiriby (M. d'Anthouard writes Tsiribihina : see vol. vii. p. 98), formed by six large arms. Several other creeks and rivers were crossed, and the Cape Rimby was rounded, when Mainty-Rano came into view, where M. Douliot spent the rainy season. Villages were very numerous along the route, mouths of rivers being favourite sites. In June M. Douliot made an excursion up the country from the mouth of the Morondava. In the sand near the shore *satra* palms are abundant, but farther inland, where the sand is mixed with clay, mangroves are the prevailing form of vegetation. The western coast of Madagascar is rising, and, as the salt water leaves the land, the forests advance. Consequently, the latter are of recent origin, and trunks of large size are rare. M. Douliot's most interesting journey was to the south, as far as the Mangoky river. Along the banks of a little river, the Manovahiriky, a short distance beyond the Manarivo, are some very flourishing plantations—marvellous in a soil of sand with but a slight admixture of clay. As M. Douliot advanced southwards, he found the country more diversified. The Lampaolo and the Maitampaky have excavated ravines in the white sandstone rock. The Mangoky, or Saint Vincent, is 550 yards broad, and is navigable by sailing canoes above Vondrové, the place where M. Douliot struck it. The climate of the western part of Madagascar is far more healthy than the eastern, not only on the coast, but also in the interior. At Vondrové the country is superb and thoroughly suited for colonisation.

African Expeditions.—On February 20th M. Foureau's mission had arrived at Tabankort between In-Salah and Ghadames, 500 miles from Biskra. In the Niger basin the French are very active. Captain Ménard, who has travelled over nearly the same ground as Captain Binger, has been killed by Samory's followers at Séguela, 190 miles south-east of Sanankoro. Nothing has been heard of the Monteil expedition for some time. It is known that it arrived last year in the territory of the Mosi. It was the leader's intention to cross the bend of the Niger approximately on the same parallel, and to enter Sokoto. Lieutenant Mizon arrived in September last at Yola, when, finding that the country to the south of Lake Tsad was in a very disturbed state, he resolved to make for the French Congo through Adamaua instead of continuing eastwards to the Shari.

M. Dybowski and his colleagues have explored the Mpoko, Ombella, and Kemo, affluents of the Mobangi, and M. de Brazza is still actively engaged on the Sangha, establishing posts on its upper course.

On the eastern side of the continent Captain Lugard has put an end to the

anarchy that prevailed in Uganda, and defeated Kabba Rega and his Mohammedan allies. Dr. Baumann left Tanga in January on an expedition to Nyanza through the country of the Masai. £4000 have been placed at his disposal for the formation of a carriage road. Herr Oscar Borchert is employed in the works necessary for the establishment of a steamer on the lake, and has been assigned a credit of £16,000 for that purpose.

AMERICA.

Grand River, Labrador.—Mr. Austin Cary, one of the members of the Bowdoin Expedition of 1891, has given an account of his experiences in the *Bulletin of the American Geogr. Soc.*, vol. xxiv. No. 1. The vessel in which the expedition sailed being delayed by ice and fogs while working up the Labrador coast, only thirty days could be spared for the ascent of the river, and, therefore, the scientific results are not so complete as was expected. The party took to their boats near the head of Lake Melville and entered the river mouth, which is bounded by two wooded points lying about a mile apart. A short distance up the river expands to a breadth of two or three miles, and is skirted by low, sandy plains ; while at a distance of a few miles on either side run steep and lofty ridges, prolongations of the rocky walls that confine the lake below. Both plains and hills are clothed with trees of large size. Twenty-five miles from the mouth occur the first obstructions, the river falling seventy feet in half a mile and forming a series of rapids. Below these lies a round lake several miles in diameter. During the next two days after passing these rapids the party noticed no change in the scenery, except that the sandy plains gradually rose into terraces, until at length they mounted to a height of several hundred feet. Trees were still abundant, spruce being the most common, though birch, hackmatack, and alder were frequently observed, and also a large variety of smaller forms. Gull Island Lake lies, according to the trappers, sixty-five miles from the mouth. It is some three miles wide and is girt by banks of sand. At its head rapids were again encountered, the first being seven miles long ; the next is divided into four distinct reaches. The most rapid piece of water lies for about a mile above and below the mouth of the Minnipi River. On August 6th Lake Waminikapu was reached, which Mr. Holme, who ascended the river thus far in 1889, places at 150 miles from the mouth. At its lower extremity the ridges approach the banks, and form a grand portal of cliffs towering several hundred feet above the water. The interior of Labrador is a plateau some 2000 feet high, and the river flows through a trough cut down through most of this depth. The valley above Gull Island Lake is at most two or three miles wide, and its sides present the appearance of parallel steeply sloping ridges, this configuration being remarkably regular along Lake Waminikapu and above. The lake, forty miles long, has been formed by the damming up of this section of the valley. Fifty miles above the lake rough water was met with, and the party had to take to the banks, until, a day or two later, they reached the great fall. Here the river leaps about 300 feet down into a cañon, called by the members of the expedition "Bowdoin Cañon." Its walls were estimated to be about 500 feet high, and the breadth of the bottom 100 yards. Several minor falls bring the total change of level up to 800 or 1000 feet. The river valley already described extends beyond the cañon, which opens into it at right angles, and at one time, no doubt, formed the main drainage channel of the country, though it is now traversed by a stream small compared to the branch that pours out of the cañon. The length of the river from Lake Melville to the fall is thought to be little less than 300 miles.

Regulation of the Mississippi.—Congress has been asked for a sum of a hundred million dollars, to be spent in regulating the bed of this river. This large sum will, of course, be spread over several years. At present many merchants prefer to send their goods by rail rather than run the risk of delays on the river. Professor Waterhouse of St. Louis, quoted in *Globus*, Bd. lxi. No. 17, states that on a journey to St. Paul he spent sixty hours on sandbanks. There is enough water to float the largest steamers if it were confined in a narrower channel. Even under the present unfavourable circumstances the traffic is very considerable. According to the last census there were 7445 vessels, with a total capacity of 3,393,380 tons, plying along the Mississippi and its tributaries. About 10,858,900 passengers and 29,405,046 tons of merchandise were forwarded by them, and the total receipts amounted to $12,598,342.

Mineral Production in the United States.—A recent United States *Census Bulletin* deals with the growth in the mineral production of the country in the ten years ending with 1889. There were fifty-five varieties of minerals produced in the United States in 1889, of a total value of $587,230,662, against a value of $217,911,662 in 1880. Amongst metallic products pig-iron has the first place in value, and is followed by silver, gold, copper, and lead. The production of pig-iron in 1889 was 7,603,642 tons, or more than double that of 1880. The production of copper nearly trebled itself in the ten years. Coal, however, is the most valuable of all the mineral products of the United States. The quantity of bituminous coal produced in 1889 was 85,383,059 tons, an increase of 123 per cent. on the production of 1880, while the production of anthracite coal was 40,714,721 tons, an increase of nearly 60 per cent. over 1880. After coal, the most important non-metallic mineral products, in order, are building stone, petroleum, lime, natural gas, cement, and salt. The value of the natural gas produced in 1889 is estimated at $21,097,000. The first production of this gas was in 1882, when the year's produce was valued at $215,000 only.—*The Times*, March 23.

Dredging Operations off the West Coast of Central America.—In the *Bull. of the Museum of Comparative Zoology*, Vol. xxiii. No. 1, Professor Agassiz gives a sketch of the expedition of the *Albatross*, referred to in Vol. vii. p. 502. The topography of the ocean bed on the western side of Central America forms a striking contrast to that of the Gulf of Mexico. The 100-fathom line, except in the Gulf of Panama and along the coast from Costa Rica to Tehuantepec, where there is a narrow continental shelf, lies within a few miles from the shore as far north as the Tres Marias Islands. The 500- and 1000-fathom lines, running parallel to the former at no great distance, form a very abrupt slope. Malpelo is situated on a rise, bounded by the 1500-fathom line and separated from the coasts of Colombia and Ecuador by a channel with over 1700 fathoms of water. Another 1500 fathoms contour, in the shape of a gigantic comma, encloses the Galapagos and Cocos Island. As regards the bottom, *Globigerina* ooze was most frequently met with, usually with an admixture of terrigenous deposits. Between the Galapagos and Acapulco the latter were found at a great distance from the shore. The surface fauna, according to Professor Agassiz, does not descend in deep water much below 200 fathoms; there is no intermediate fauna living between that depth and the bottom, and the free-swimming bottom species do not rise to any great distance. Results obtained on the *Challenger*, *Gazelle*, *Hirondelle*, and other vessels, which seem antagonistic to this view, he attributes to the use of open tow-nets, or such as the Chun-Petersen net, which does not always close tightly. On board the *Albatross* a net invented by the Commander, Captain Tanner, was used, and was found perfectly trustworthy.

Professor Agassiz rejects the notion that the Galapagos were ever connected with the American continent. They have been formed by submarine eruptions at first, and subsequently by volcanic accretions above sea-level, until finally some of the islands have reached an elevation of over 3000 feet. During this process of growth some of the islands have become united, as, for instance, Albemarle, which is probably composed of three islands, originally independent. Their fauna and flora probably owe their origin to the agency of trade-winds and currents. The tortoises, from which the islands take their name, have almost entirely disappeared. Indefatigable Island, forming a circle about twenty miles in diameter round a central cone, has greater natural resources than any other in the group, but it is uninhabited and wholly undeveloped. Narborough Island is clothed with a rich covering of green foliage, while Albemarle is utterly barren and desolate. Gardner's Bay, in Hood Island, affords good anchorage in the fine weather that usually prevails, and James Bay, on the western side of the island of the same name, is protected from the prevailing winds. Some further information regarding these islands may be found in vol. v. p. 45. Professor Agassiz's report is accompanied by a bathymetric chart, a map of the Galapagos Islands, and several diagrams and illustrations.

Mount Roraima.—This table mountain, standing on the confines of British Guiana, Venezuela, and Brazil, was first ascended by Mr. Im Thurn and Mr. Perkin in 1885. Until then the precipices, 2000 feet high, forming its summit were considered insurmountable. In November last two orchid-hunters, Messrs. Cromer and Seyler, spent a night on the summit. They were amazed, like Mr. Im Thurn, at the extraordinary shapes of the rocks strewn around. Innumerable tarns, one of which was 150 yards across, are joined by canals. The scarlet *Utricularia*, which grows on the slopes of the mountain, was found also on the summit, as well as some new orchids. Of animal life there was little.—*South American Journal*, May 7.

Argentina.—Through the courtesy of his friends, we have had an opportunity of perusing a diary by Mr. F. J. Matthew of a ride of 1000 miles through a little-known part of the territory of the Republic. On October 5th he started from Buenos Ayres by train, and reached Mendoza on the 7th. Thence he travelled, partly by coach, partly on horseback, to San Rafael, a distance of 210 miles. Having collected a store of provisions, the traveller set out on November 16th, with six mules and a man, and, crossing the river Diamante, took a westerly direction towards the Cordilleras, the route being through very beautiful scenery, for the Andes were not far distant, and the second night was passed at an elevation of 4450 feet above sea-level. On the third day the river Atuel was reached, and two or three days later Mr. Matthew rested at the *estancia* of an English doctor living in Mendoza, where 15,000 sheep and 6000 or 7000 head of cattle are fed. Thirty miles from this *estancia* lies the lake Llancanelo, a narrow sheet of water several leagues in length. Two years ago part of it dried up, leaving a flat expanse of smooth sand nine miles across. Seen from the middle, this sandy plain has a bright blue, glassy appearance, and counterfeits water wonderfully. The lake is fed by two streams, but has no visible outlet. It is said to be drained by a subterranean stream. At any rate, in the dried bed are to be seen several of those funnel-shaped depressions common in the Karst formation : their sides are encrusted with salt. The country around is wild, and the climate cool, the altitudes at which the camp was pitched being 5600 to 5800 feet. Game is plentiful. Herds of guanacos were often met with, and pumas are so numerous that horse-breeding is impossible,

as they kill all the foals. Near Chacaico, where Mr. Matthew stayed a month, he observed eagles, condors—which are very destructive among the calves and sheep—rattlesnakes, otters, and a variety of chinchilla (probably the Alpine viscacha, *Lagidium Peruanum*). At Agua Nueva, twenty-one miles east of Chacaico, a large quantity of stock—horses, cattle, sheep, and goats—is fed by squatters, who pay a small rent for the use of the *camp* or run (*campo*). The pasture is excellent, but last year locusts played great havoc among the more tender grasses. The return journey was made across the Atuel and Salado rivers, and over the Central Pampa to Trenque Lauquen. The country, at first rocky, changed to level pampa of poor soil covered with prickly shrubs. Rain came down in torrents and swelled the rivers, so that they were difficult to cross. Water, which is scarce even among the mountains, is often not to be procured during a ride of fifty miles. Mosquitoes were troublesome, and at one camp a swarm of locusts obliged the traveller to pack up and move on. In the province of San Luis woods began to appear, and improved the landscape. Near Cochico is a series of shallow lakes of brackish water, studded all over with dry, barkless trees. For two or three days Mr Matthew rode through dense woods, and then entered the grassy pampa, where *estancias* were more numerous, and the track well worn. Nothing but grass, reaching up to the knee of a man on horseback, can be seen the whole day long. Most of it is *pasto amargo* (bitter grass), and the sheep do not seem to thrive on it. The sheep are of different breeds—Lincoln, Merino, Rambouillet—and the cattle mostly crossed shorthorns. Trenque Lauquen is on a railway, by which Buenos Ayres can be reached in twelve hours.

MISCELLANEOUS.

On March 30th, **Captain Bower and Dr. Thorold** arrived at Shanghai, having travelled from Kashmir through Ladakh, Tibet, and Western China.—*Globus*, Bd. lxi. No. 17.

The **railway** which is at some time or other to traverse the **African** continent has been opened as far as a point near Cazengo, 140 miles from the starting-point, St. Paul de Loanda.

It has been resolved to remove the seat of government of the colony of Obok to **Jebute**, which has the advantage of a safe harbour. It is also an excellent terminus for caravan routes leading to Harrar and Shoa.—*L'Afrique*, April, 1892.

Herr Richard Payer has crossed the South American continent **from Pará to Lima**. Setting out from Yquitos on February 27th, he passed over the Portachuelo pass and through Huanaco, Cerro and Chicla, reaching Lima on September 20th.—*Petermann's Mitt.*, Bd. xxxviii. No. 4.

The Italian Geographical Society is organising a **Geographical Congress**, to be held in Genoa, in commemoration of the fourth centenary of the **discovery of America**. All geographical societies are invited to send delegates. The Congress will take place about the middle of September.

The **Budget of the Congo State** for 1891 shows a deficit of £280,000. The regular revenue yields only a tenth of this sum, and is supplemented by the Royal subvention and an advance made by Belgium. It is hoped that in future the situation may be improved by the introduction of the custom duties authorised by the Brussels Conference.

In laying the telegraph cable between California and Honolulu the **bottom of the Pacific** in that part has been found to be very irregular. The difficulties encountered are sudden drops, such as from 400 to 2700 fathoms, followed by a rise to, perhaps, 2000 fathoms, besides a few active subaqueous volcanoes.—*The Colonies and India*, April 30th.

A South African and International Exhibition will be opened at Kimberley in September. The processes of winning diamonds and gold will be shown: the machinery department will contain a large variety of machinery employed for mining and agricultural purposes; and the agricultural interests of the colonies and neighbouring states will receive special attention.

At the commencement of 1891 the **Bureau of American Republics** was established at Washington. Its object is the preparation and publication of bulletins relating to the commerce and resources of the States of the American continent, and it is believed, during the one year of its existence, to have been the means of extending commercial intercourse. The expenses of the Bureau are shared by the States in proportion to their populations.

The *Trans. of the Royal Society of Edinburgh*, vol. xxxvi., part 3, contains a report by Dr. H. R. Mill, embodying the results of his investigations in the **Clyde Sea Area** during a cruise of the *Medusa* in 1888, of which he gave a sketch in vol. ii. p. 347. The configuration of the bottom, the temperature and salinity of the water, and the rainfall were ascertained by a series of accurate observations, and are exhibited here in numerous tables, diagrams, and maps.

Professor Griesbach, who was commissioned by the Indian Government to conduct a geological survey of the Central Himalayas, having sent to Vienna fossils of the Mesozoic period, strikingly similar to those of the same age found in the Alps, the Akademie der Wissenschaften resolved to send out an expedition for the purpose of comparing the **Geology of the Central Himalayas** with that of the Eastern Alps. The leader, Dr. Karl Diener, set out on the 10th April for Kumaon. —*Globus*, Bd. lxi. No. 15.

The Academy of Natural Sciences of Philadelphia has unanimously voted in favour of the organisation of an expedition for the relief of **Lieut. Peary** and his companions. Professor Angelo Heilprin has been appointed to the command. As nothing has been heard of Lieut. Peary since the *Kite* returned to Newfoundland in August last after landing the party in Greenland, and as the original plan provided for an absence of two years, the *Bull. of the American Geogr. Soc.* thinks the assumption that assistance is needed is premature.

The Instituto Geografico Argentino has resolved to investigate the **navigability of the Rio Otuquis**, and has accepted the offer of his services, made by Señor J. H. Barnes, lieutenant in the Argentine navy. This river lies wholly in Bolivian territory, entering the Bahia Negra not far from Olimpo, on the Paraguay. It is said to be navigable for a distance of more than fifty leagues, and it is possible that communication with Bolivia, hitherto sought in vain, may be established along this waterway.—*Bol. del Instituto Geogr. Argentino*, Tomo xii. Nos. vii. y viii.

NEW BOOKS.

Travels amongst the Great Andes of the Equator. By EDWARD WHYMPER, 1892. Pp. xxiv + 456. Maps and Illustrations, etc. *Price* 21*s*.

Supplementary Appendix to the above. With Illustrations. Pp. xvii + 143. *Price* 15*s*. London: John Murray, 1891.

It is well known amongst geographers that there is considerable diversity of opinion regarding the injurious effects upon human beings of the diminished atmospheric pressure existing at great elevations above the sea-level. The author of the present work, whose name is well known in connection with Alpine climbing, has paid considerable attention to the phenomena in question, and in the book before us he gives us the results of a journey to the Equatorial Andes, which he undertook, in 1879, mainly for the purpose of collecting further data upon the subject. Amongst other questions of the same character, which could best be answered by means of information collected at great elevations above the sea-level, were those concerning the relative value of boiling-point observations, as compared, on the one hand, with the results given by the aneroid, and, on the other, by those obtained by means of the mercurial barometer.

Then, again, the general character of the fauna, and, especially, of the flora, existing at great elevations near the Equator, throwing so much light, as they do, upon the history of the later changes which the Earth's surface has undergone, were further questions of interest to engage the attention of a scientific traveller.

A mere glance at the book will show that the author has steadily kept these, as well as other scientific matters, constantly in view; while a careful study of its contents shows that every chapter in the book contains some more or less important additions to our stock of knowledge in almost every department of science.

But the book is by no means a dry record of scientific facts and observations. On the contrary, it forms a most interesting narrative of travels; and while it is written in such a style as to engage the attention of those who do not care to go deeply into scientific questions, it furnishes at the same time abundant material for study for those who do.

The general tone of the book indicates that the author made friends amongst people of all ranks of life wherever he went. Like many other travellers, Mr. Whymper found that a policy of forbearance and good-will led to pleasant relations with the South American people, just as much as they would in Europe. The concluding paragraph of the author's introduction furnishes a useful piece of advice in this connection, upon which the traveller would do well to act:—

"We travelled through Ecuador unarmed, except with passports, which were never exhibited, and with a number of letters of introduction, which for the most part were never presented; adopting a policy of non-intervention in all that did not concern us, and rigidly respecting the customs of the country, even when we could not agree with them; and traversed that unsettled Republic without molestation, trusting more to our wits than to our credentials, and believing that a jest may conquer where force will fail, that a *bon-mot* is often better than a passport."

The book is beautifully got up in every respect—the paper, printing, numerous illustrations, and binding being all that could be desired.

In a work containing so much scientific matter it is impossible to notice all the details, but a few of the sections likely to be of special interest to scientific geographers will be found under the following references:—

Pp. 34-36 and Appendix C give the results of the author's observations upon the relative values of the different barometers. He considers that the best aneroids

are much less reliable than the mercurial barometer for altitude observations. His modes of transporting and of using the barometer are stated in detail on pp. 53-57. Appendix D gives valuable details upon Boiling-Point observations.

In describing his first ascent of Chimborazo, the author takes occasion to give the results of his experience in regard to the important matter of commissariat, and makes some observations upon Mountain Sickness. The freezing-point at night on Chimborazo was reached at an elevation of 14,000 feet. In a region which is essentially one of active volcanoes, it was to be expected that the author would collect many facts and observations bearing upon these striking features of the earth's surface; and to those interested in geology these form some of the most interesting parts of the book. Pp. 73-5 deal with an eruption of Sangai. Violent outrushes of steam took place at intervals of twenty to thirty minutes, the velocity of each outrush being computed at twenty-two miles per minute. The steam rose in the form of a column to an elevation of five or six thousand feet above the summit of the mountain, and then took the form of ordinary cumulus, which drifted southward at an elevation of about 23,000 feet above the sea. At pp. 125-129 is given a most interesting description of an eruption of Cotopaxi in 1877. Columns of ash had been ejected from time to time in the early part of the year: but on Monday, June 25th, an immense black column of ash was suddenly projected miles into the air, the eruption being accompanied by tremendous subterranean bellowing. Towards night the volcano quieted down; but early next morning another violent eruption of fragmentary materials took place, the ejected material being dispersed by the winds in all directions. In Quito it became so dark by 8 A.M., through the air being loaded with volcanic dust, that people had to grope their way about in the streets. By 10 A.M. part of the dust-cloud had been sufficiently dispersed by air-currents to admit of the summit of the volcano being seen. Then molten lava rose in the crater, and thence poured downward through the notches in its brim, bubbling and steaming like "the froth of a pot that suddenly boils over." This was visible for only a few minutes, for the incandescent lava, flowing over a surface formed largely of snow and ice, soon gave rise to a violent deluge of water, by which vast masses of rock, stones, mud, and ice were swept headlong down the side of the cone, devastating everything in its way. It is estimated to have travelled as far as Latacunga at the rate of fifty miles an hour. The author may well marvel at the stupendous power of the subterranean force which sufficed to elevate this vast mass of incandescent lava—hundreds of million tons in weight—to an elevation of 19,000 feet above the sea. Some of the secondary results of this eruption are described in detail in the same chapter.

The nature and characteristics of volcanic ejectamenta are described in some detail on pp. 140-142. Professor Bonney made a careful microscopic examination of specimens both of these and of the chief lavas brought home by the author. The majority of them were, of course, of an Andesitic character, and their constituents were plagioclase felspars (oligoclase and labradorite) with one or other of the ferro-magnesian silicates, pyroxene, amphibole, or biotite. In composition, therefore, these volcanic rocks of the Andes agree with that of the majority of those occurring in the Caledonian Old Red, as well as with that of many of the later volcanic rocks of the Carboniferous system in Scotland. The author describes his visit to the crater of Cotopaxi, pp. 150-153, and some further observations on volcanic ash on pages 326-329, to which the reader is referred for details.

Several excellent views of volcanic and other natural phenomena, taken from photographs, adorn the volume.

The elevation of the snow line on different eminences is given at p. 347, and is

followed by a brief notice of the glaciers of Ecuador. The author states that, in essential features, these do not differ from the glaciers of the Alps. The ethnology and the archæology of the district occupy a considerable part of the first volume, and are, like the other subjects, fully illustrated.

The author's observations upon the zoology and botany of the district visited are of much importance to naturalists. The general conclusions to be drawn from a study of the large collections brought home by Mr. Whymper are dealt with in the second volume, chiefly by the late Mr. H. W. Bates. They may be briefly stated as follows:—It has long been known that there exists a remarkable relationship between the flora and fauna of Chili and those of high latitudes in North America and even in Europe. Sir Joseph Hooker states, in Darwin's *Origin of Species*, that no fewer than forty-six species of flowering plants of Chili and Europe are identical (this is now known to be below the number); and the nature of the evidence in general points to the migration of these plants from Europe to Chili having taken place through North America. The explanation usually accepted is, of course, that the plants migrated from north to south during the glacial period. Mr. Bates, however, after studying the collections brought home by Mr. Whymper, comes to the conclusion that this explanation, although applicable to the plants, is not borne out by the geographical distribution of the insects. He thinks, however, that in the case of the insects there may have existed some obstacle to free migration, which did not affect the plants.

Space does not admit of fuller notice of the many problems of biological interest suggested by the second volume of Mr. Whymper's work; but no zoologist can but glance through it without seeing at once that it is full of matter of as much interest for him as the first volume is for the general reader and the geographer.

Siberia as it is. By Harry de Windt, F.R.G.S., author of *From Pekin to Calais by land*, *A Ride to India*, etc. With an Introduction by Her Excellency Madame Olga Novikoff ("O.K."). London: Chapman and Hall, Limited, 1892. Pp. xxiv. + 504. *Price* 18*s*.

Mr. Harry de Windt's *Siberia as it is* is a geographical polemic. It is at once a defence and a reply. It is a defence of the Russian system of prison administration, and it is a reply to Mr. George Kennan and other travellers and writers, who have attacked that administration as a system of cruelties and atrocities which is a disgrace to a civilised country and to the nineteenth century. The author has found a powerful coadjutor in Madame Olga Novikoff, whose "Introduction" forms a valuable indorsement of his descriptions and arguments. According to Madame Novikoff the British public is misled by misrepresentations. "England," she says, "has nothing to gain by not only ignoring the truth, but by acting under absolute misrepresentations and calumnies. I declare and insist upon this positive fact. Credulous readers of English newspapers—these latter-day gospels—are misled, shamefully misled, by a great portion of the press."

Madame Novikoff's views were strikingly confirmed at St. Petersburg by those of M. Demetrius Kamorski, Inspector-General of His Imperial Majesty's prisons in Siberia, who furnished Mr. de Windt with papers authorising him to visit the prisons of Tiumen, Tobolsk, and Tomsk, at any time of the day or night that suited him, to see everything, and to converse freely with the prisoners, even the political prisoners. "The credulity of the English," said M. Kamorski, "has always amused me. They will believe an American journalist, but not their own countrymen, I mean so far as the Russian penal system is concerned." M. Kamorski's subsequent remarks seem to supply a key which may serve to explain

the discrepancy between the accounts of previous travellers and that of Mr. de Windt. He said :—

"'Reforms are slow in Russia, for money is scarce, though you will see prisons already completed in St. Petersburg and Moscow equal, and perhaps superior, to any in England. Our new cellular prison here, for instance, cost nearly two millions of roubles, and was recently acknowledged by one of your own countrymen, connected with English penal establishments, to be the finest in the world. As regards your voyage : Tomsk and Tiumen are the prisons lately described in the English press (and by people who have never even seen them !) as "hells upon earth." Heaven forgive them ! I suppose horrors make your papers sell. There must be a motive for these fabrications. Nevertheless I do not deny that you will find the Tomsk forwarding prison bad as regards accommodation ; and Tiumen is, I admit, in a very unsatisfactory condition. And why? For the simple reason that the question was mooted in 1887 of abolishing transportation to Siberia, and sending convicts by sea direct to Sakhalin. The Government did not therefore feel justified in repairing the old prisons or building new ones, for the simple reason that it would have been a useless expense. Now, however, that matters are definitely settled, the work is progressing as fast as possible. As you say in England, "Rome was not built in a day." Bad as the prisons are,' added M. Kamorski, with a meaning smile, 'I think you will hardly find them "hells upon earth ;" and I am afraid, if you are in search of sensational matter, you will be grievously disappointed.'"

It is not unreasonable to infer from this passage that Mr. Kennan and the other adverse critics may have described faithfully enough the state of Siberian prisons as they were several years ago, before the introduction of the reforms to which M. Kamorski refers, and that Mr. de Windt's descriptions relate to the particular prisons which he visited, as they are now.

Mr. de Windt's account of his journey from St. Petersburg to Moscow, from Moscow to Nijni-Novgorod, from Nijni-Novgorod to Ekaterinburg and thence to Tiumen, Tobolsk, and Tomsk, is very interesting, though it does not add much to geographical knowledge. His description, for example, of Moscow appeals strongly to the mind of every one who has visited that superb Oriental city. The method of conveying prisoners in caged barges over the rivers of Siberia is most minutely described, and the conclusion is forced on the reader that the horrors of the middle passage, with which American travellers have made us familiar, are very much matters of the imagination. That is true also of the Siberian prisons visited by Mr. de Windt. Here, for example, is his account of what he saw in the Peresilni, or forwarding, prison of Tomsk :—

"I note with some surprise that, although the large square windows are securely barred, the doors of every building are thrown wide open. The yard is thronged with men and women strolling or lounging about, and seated on the doorsteps of the log huts, chatting and joking, and, in some cases, smoking. In many I recognise old acquaintances from the barge, who smile and nod ; but the majority of the faces around are strange to me. . . . I search in vain for the misery, squalor, and filth of which I have read so much, the horrors with which we have been regaled *ad nauseam* in the English and American press. The interior of a French or English gaol is far more grim and forbidding than this open-air prison, where iron discipline and the maddening silence of solitary confinement are apparently replaced by the society of both sexes, freedom of speech, and cigarette-smoking !"

Mr. de Windt availed himself fully of his permission to go everywhere at all times and to converse with all classes of prisoners. His description of the prison hospital is very much to the point :—

"A light airy room, large sash windows, with blinds and shutters, a score of iron bedsteads (three of them occupied) ranged against either wall, and a couple of nurses in neat black dresses and white aprons in attendance. . . . The dispensary, hard by, was spacious and well stocked, while the doctor who conducted us round seemed to take pride in the cleanliness and comfort of his infirmary, and

complacently pointed out the snowy bed-linen, dainty food, of which two or three patients were partaking, and admirable arrangements for ventilation." [1]

He also paid a surprise visit to the Peresilni by night, and inspected the forwarding prison at Tiumen, where he found the arrangements equally satisfactory.

It is certainly difficult to question the accuracy or the honesty of these testimonies to the actual condition of Siberian prisons. It may be said, of course, that Mr. de Windt's visits were brief, and were made under official surveillance. It is also true that he visited only three of the Siberian prisons ; but it does not appear from his narrative that the officials who accompanied him put any obstacles in the way of his seeing whatever he wished to see, or that any special preparations had been made for his visits. Mr. de Windt does not by any means stand alone as an apologist for the Russian prison system. He quotes, in his closing chapter, a round dozen of other travellers, from Mr. Herbert Cottrell in 1852 to Mr. Charles Cook in 1891, all of whom confirm in the fullest manner his account of what he found and saw. It further appears from his narrative that many of the prisoners sent to Siberia enjoy their life there, and find it more profitable to settle in the country than to return home. It is evident that there are two sides to this question ; but even if we accept all Mr. de Windt's statements as to the excellence of the arrangements, and the humanity with which the prisoners are treated, there remains enough of barbarity in the compulsory expatriation of men and women of education, intelligence, and high social standing, to make the penalty unnatural and repulsive.

The Naturalist in La Plata. By W. H. Hudson, C.M.Z.S. London : Chapman & Hall, 1892. Pp. 383. *Price* 16*s.*

Mr. W. H. Hudson has been long known to naturalists as one of the most fascinating writers on the habits of animals that we have, as well as a most accurate observer. His promised book on the natural history of La Plata was eagerly looked forward to, and now that it has appeared, it has at once taken its place with naturalists as the book of the season, and as the most charming book on the ways of animals which has appeared for many years. Having had many opportunities of observation in the region of which Mr. Hudson writes, we can testify to the accuracy of his descriptions, and can recommend every statement made on his own authority as absolutely reliable. The book is packed from cover to cover with delightful descriptions of the various animal inhabitants of the "Pampa," charming alike from the freshness of their style and from the evidence which peeps forth in every line how thoroughly the author has been able to bring himself into touch with the animals he has observed. And to the scientific naturalist a special and deeper interest is given by the intimate and important bearing of many of the observations recorded upon various prominent biological speculations. The book opens with an excellent general account of the Pampa and its inhabitants, while succeeding chapters are devoted to description of some of the more interesting animals of the region, such as the puma, the skunk, mosquitoes and parasites, humble-bees, wasps, fire-flies, spiders, humming-birds, the crested screamer, and the biscacha : or to the description and discussion of various general biological problems suggested by Pampa observation, such as "Waves of Life," "Instincts," "Mimicry in Grasshoppers," the "Death-feigning Instinct." Amongst these last comes what is perhaps the best chapter in the book, entitled "Music and

[1] "I may mention that this is the hospital which (according to the *Century Magazine*) 'is so saturated with contagious disease that it is unfit for use.'"

Dancing in Nature," which gives a most interesting account of those ebullitions of sexual excitement to which so many animals are subject, and which most frequently finds expression in outbursts of song or in the performance of strange dance-like antics. After an account of several remarkable, and to the uninitiated almost incredible, instances, the chapter concludes with a powerful criticism of the generally accepted views as to the development of such habits through the action of sexual selection, and a very successful attempt to prove them to be due merely to the condition of exuberant vitality which precedes the breeding season. We have said perhaps enough to draw attention to the great value and interest of the "Naturalist in La Plata." The only way that the reviewer can do justice to such a book is to give long extracts, but this space forbids.

The book has many illustrations, which, as specimens of art, are very beautiful, but which, unfortunately, bear every evidence of having been manufactured in this country, and are in many cases fundamentally bad and untrue to nature. It is unnecessary to mention the more flagrant examples, but attention may be drawn to that facing p. 133, which represents presumably a party of Argentine "peones" mounted upon English thorough-breds, with English bits and bridles! These little blots on the pages of the work serve, however, merely to throw into stronger relief the excellence of the letterpress, and we can cordially recommend the "Naturalist in La Plata" to all lovers of nature and to all interested in the zoogeography of South America.

Mediæval Scotland: Chapters on Agriculture, Manufactures, Factories, Taxation, Revenue, Trade, Commerce, Weights and Measures. By R. W. Cochran-Patrick, LL.D. Glasgow, LL.B. Cantab., B.A. Edinburgh, etc. Glasgow: James Maclehose & Sons, 1892. Pp. vi. + 200. *Price 7s. 6d.*

Mr. Cochran-Patrick's *Mediæval Scotland*, though its substance originally appeared in a series of side articles in a Glasgow newspaper, is a very able and learned work. The sub-title, quoted above, sufficiently indicates its scope; and it is only necessary to add that its period extends from prehistoric times to the Union of the Kingdoms in 1707, to show that it is as comprehensive in respect of time, as it is certainly minute and exhaustive in respect of detailed information. If it be true, as we believe it to be, that the domain of geography embraces everything that bears upon or illustrates the relation of man to his physical environment, the work of the Permanent Secretary for Scotland must be regarded as a most valuable contribution to the historical geography as well as to the social and industrial history of Scotland. Mr. Cochran-Patrick has drawn his material entirely from original sources. He has gone to the national records issued by the authorities of H. M. General Register-House, including the early Acts of the Scottish Parliament, to the Register of the Scottish Privy Council, to the Rolls of the Exchequer and the Accounts of the Lord High Treasurer, to the Register of the Great Seal, to the Register of the Convention of Royal Burghs, as well as to the records of private bodies and individuals, and he has focussed with genuine historic and antiquarian instinct the results of his manifold and comprehensive inquiries. It would be impossible, within the limits at our disposal, to do justice to the wide and varied range of subjects embraced in this modest volume of 200 pages. Every page bristles with facts and figures bearing on the several subjects dealt with in the volume—on agriculture, on manufactures, on fisheries, on taxation and revenue, on trade and commerce, and on weights and measures. The adequate treatment of these subjects would require a separate article on every chapter of the book. All that can be said—and we have pleasure in saying it—is that every chapter is brimful of the most valuable information, conveyed in the clearest and most admirable style.

Imperial Defence. By Sir Charles W. Dilke, Bart. and Spenser Wilkinson. London: Macmillan & Co., 1892. Pp. 234.

Read in conjunction with our series of papers on *Britannic Confederation*—for there is a distinct unity of purpose between them—this work is published most opportunely, and carries with it an authority that will not be disputed. With army administration and reform we have nothing to do, and may pass over this portion of the book with the remark, that the joint authors appear to make out a very clear case that reform of some sort is urgently desired, whilst their suggestions have the merit of being neither too revolutionary nor wanting in common-sense. The essential duty of Great Britain to retain "the primacy of the sea" is properly insisted upon, and in this respect readers of *Britannic Confederation* will find a great deal of supplementary information of the highest value. "The resources of the British Empire are so vast, that if it were believed that they would be fully and freely employed, and were reasonably organised for defence, no statesman of any nation would in his sober senses dream of provoking a conflict single-handed" (p. 53). "We believe that the near future will test the British Empire, and determine whether it has a work to do in the world, and whether it has strength to do it" (p. 233). The task of *Britannic Confederation* was to provide the material for the profitable discussion of this subject; for, as our joint-authors state, "without geography neither political nor strategical wisdom can go far" (p. 113).

We recommend *Imperial Defence* to our readers as not only of value because it supplements our own work in a department with which we cannot deal, but also on account of its intrinsic merit and interest. The defence of India is dealt with in considerable detail, and incidentally a good many interesting geographical facts are marshalled in due order of their importance and significance.

Beast and Man in India. With Illustrations. By John Lockwood Kipling, C.I.E. London: Macmillan & Co., 1891. Pp. xii+401.

This beautifully illustrated book will afford the greatest pleasure to every reader, whether he has been in India or not, while for those who have not visited that country, but take any interest in its people, it is pregnant with instruction. Mr. Kipling has for many years been a careful, intelligent, and sympathetic observer of animal life in India: he has an eye for the picturesque and the beautiful, as well as for truth, and he has now told in most attractive fashion how animals behave in relation to human beings, how they are treated by the people, and what are the beliefs of the people in regard to them as expressed in proverb, legend, and religious creed. Where all is so good it is difficult to particularise, but probably the best chapter, as it is the fullest, is that on cows and oxen. While all who are fond of animals will find much to amuse and entertain, the light incidentally thrown on the character of the people may well move the reader to serious thought. Not that there is any prosy didactic moralising: the truth, however important, is lightly hinted rather than dogmatically stated and enforced. Thus one feels the importance for the governing class of knowing the beliefs of the people when he grasps the truth that there are myriads in India to whom respect for the cow and loathing for the pig are the Alpha and Omega of their faith, or comes to understand the serene indifference of the peasant to much that stirs the English mind, and produces a fussy meddling with other people's business. Mr. Kipling renders the treatment of animals by the people very intelligible by the numerous illustrations he gives of two prominent features in their character. The first is that it never occurs to the peasant that an animal can suffer: the other is the absence of

scientific interest and of curiosity, and a consequent amazing ignorance of elementary facts in regard to animals with which he lives in intimate familiarity. By no means the least valuable passages are those giving evidence of the far-reaching effect of British rule on social condition, simply because of the freedom it secures and the education it provides. These are but a small sample of the truths that are incidentally expressed and illustrated with a light touch and in a graceful style. The happy epigrammatic phrase that illuminates and insinuates the truth reminds one not unfrequently of the author's famous son, and shows whence the latter has inherited his gift.

Recollections of a Happy Life: being the Autobiography of Marianne North. Edited by her sister, Mrs. John Addington Symonds. 2 vols. London: Macmillan and Co., 1892. *Price* 17*s. net.*

Miss North ought to be well known as the admirable painter of the vegetation of nearly every region of the globe from the collection at Kew which she created, housed, and presented to the nation in June 1882. It is one of the sights at Kew which no visitor of culture should omit from his or her programme. To produce that great collection of plants, painted in their native habitats, involved fifteen years of almost incessant travel, from 1871 to 1886, in many lands. And the narrative of her life and adventure is told in these volumes in a style so picturesque and fascinating, so free from technical expressions, so full of sympathy and natural simplicity of presentation, that few works have appeared in recent years which, as records of travel, can be placed above them. They are truly the records of happy recollections of a highly cultured lady of remarkable activity and indomitable spirit, who had the rare art of making the least of difficulties and the most of all opportunities, and who has narrated her wide and varied experiences with kindly humour in graceful literary style. This work ought to be a favourite with young and old.

De Hanoï à Pékin: Notes sur la Chine. Par Lieutenant-Colonel Boüinais. Avec une préface de M. A. Rambaud. Paris: Berger-Levrault et Cie., 1892. Pp. xlv. + 376.

Being sent on a mission to Pekin in 1887, M. Boüinais had an opportunity of visiting Hongkong, Canton, and Shanghai, as well as Tientsin and the Chinese capital. As far as a description of these towns is concerned the work is merely, as the author styles it, *Notes sur la Chine.* A large portion of the work, and by far the most important, is devoted to the diplomatic relations of European nations with China and commercial progress. The author insists on the necessity of combined action to resist the evasive policy of the Tsung-li-Yamen, which is ever ready to shirk the redress of grievances by playing off one Power against another. On European commerce in China Colonel Boüinais writes with good sense and moderation. Far from following the example of those writers who pour forth invectives against *la perfide Albion* whenever British subjects gain an advantage, he looks upon commercial enterprise as a field for friendly rivalry, where the successes of one nation should stimulate others to greater exertion, and has a word of praise for those who have advanced their country's interests, whether they be Britons, Americans, or Germans. Naturally desirous to see his own country obtain a considerable share of commerce with the Chinese Empire, he points out the faults that have been committed in times past, and exhorts his fellow-countrymen not to neglect the opportunity that now presents itself of drawing the trade of Yunnan and Western Quang-si to the ports of Tongking.

España y sus Colonias. Noticia de su Población, Agricultura, Industria y Comercio segun los mas recientes datos estadisticos. Por D. Manuel Escude Bartoli y D. Luis P. Ramon, bajo la dirección de D. Pablo Riera y Sans. Barcelona: Establecimiento tipografico editorial de Riera, 1891. Pp. 277.

This volume forms a supplement to a *Diccionario de España y sus Posesiones de Ultramar* issued by the same publisher, and contains, besides other matter, the results of the census of 1887. It is interesting to notice that the ratio of increase of the population was much larger during the decade 1877 to 1887 than in earlier periods, being 5·5 per cent. The populations of the capitals of provinces are given, both for 1877 and 1887, but, since in the first case the totals are omitted, there is no means of ascertaining directly the movement of the urban relatively to the rural population. A similar omission occurs in the statistics of railways: the exact total length of lines opened to traffic, in construction, and projected is given; but it is added that *about* 10,000 kilomètres were opened to traffic in 1888. In the other tables, of commerce, mining, manufacture, etc., the comparative element is almost entirely wanting, and the information concerning the colonies is extremely meagre, except as regards the administration and the church, much of which might advantageously be replaced by more detailed information concerning the state and progress of the inhabitants. It must be remembered, however, that this work is only a supplement, and, therefore, a correct judgment cannot be passed upon it without access to the larger work. An error has certainly been committed in calling the inhabitants of Fernando Po, Annobon, and Corisco all Bubis. As regards Spain itself there is a vast amount of information of the most varied kind in a form suitable for reference.

History of British Guiana. By James Rodway, F.L.S. Vol. I. Georgetown, Demerara: J. Thomson, 1891. Pp. 312. *Price* 3 $.

In this, the first volume of Mr. Rodway's work, he treats of the period extending from 1668 to 1781, that is to say, from the time when the "Trading Factories" were established by the Dutch to the time when the "Three Rivers" were captured by the British. Towards the end of the sixteenth century small Dutch vessels began to trade in the West Indies for salt—an article of prime necessity for the fisheries. That was the origin of the Dutch connection with this coast. Its natives, the fierce and warlike Caribs, did not object to the Dutch, for the latter were at war with the Spaniards, the foes of the Caribs. Thereafter the Dutch established trading factories; but it was the Negro slave-trade that vastly developed this colony as well as the West Indies generally. Mr. Rodway carefully narrates its history, and shows us how the colony gradually grew in wealth and population. His next volume will give us its progress during the nineteenth century, and we trust that it will be accompanied by (what volume i. lacks) a good map of British Guiana.

The Advanced Class-book of Modern Geography. Physical — Political — Commercial. By William Hughes, F.R.G.S., and J. Francon Williams, F.R.G.S. London: George Philip and Son, 1892. Pp. 818. *Price* 6*s*.

Although this class-book is large, cheap, and well printed, we are not prepared to concede the appropriateness of the definite article in its title. It contains a mass of information which is undoubtedly of great value, and there is one feature new in educational manuals of this class which we cannot praise too highly. This is the insertion of numerous—we are almost tempted to write innumerable—references to books of travel, and current geographical literature. The references, it is true, might be more judicious, and freer use might well be made of works by

several geographical publishers not largely represented in this edition. The physical geography of the "Introduction" is in a sense "modern," but certainly not up to date. "Of the 270 known asteroids" would have been correct in 1887, when No. 270, Anahita by name, was discovered, but in "January, 1892," when the preface is dated, the correct number was 324. The theory that the sun moves "round some immensely larger and more distant sun" is not now held by astronomers; nor are the rotation periods of Mercury and Venus now accepted as 24 and 23¼ hours respectively. The earth intercepts only one-tenth of the amount of sun-heat with which it is credited on p. 5. These instances lay before us in pp. 4, 5, on opening the book at random. It is strange that a map-maker like Mr. Williams should describe as Mercator's projection (p. 23) the simple cylindrical projection, which is rarely or never used and does not possess the property of showing correct bearings.

Political geography is better treated than physical, and the work is in this respect laboriously compiled and, in the main, thoroughly revised. It is unfortunate, however, that style and arrangement owe little to the modern works from which many of the facts are culled. In the account of Scotland it is stated (p. 150) that the reason why the west coast is so deeply indented is that "the huge billows of the Atlantic dash upon the coast with irresistible force." Surely it is time that this absurd statement should disappear from text-books. Every one knows, or ought to know, that our sea-lochs are simply submerged valleys; while a glance at the map might inform the least versed in geology that most of the deep inlets in question occur in situations sheltered from Atlantic billows. The "broad plain called Strathmore" is said to stretch from Stonehaven to Dumbarton, and to separate the Highlands from the Lowlands. A book like this is so much sought after by students for examinations that we would willingly see it better.

Longmans' School Geography for North America. By George G. Chisholm, M.A., B.Sc. and C. H. Leete, A.M., Ph.D. Second Edition. New York: Longmans, Green and Co., 1891.

We noticed in February Mr. Chisholm's *Geography for South Africa.* His *School Geography for North America* is on the same plan; that is to say, after a general introduction on mathematical and physical geography, which is common to the successive volumes, the foremost place is given to the detailed geography of America, which is presented on a larger scale than would be considered necessary for students in Europe. Nearly the same space is allotted to North America as to all the States of Europe, namely 102 pages, while Asia receives forty-three pages, Australia nineteen, and Africa only fourteen. Whereas in the South African Geography African and Australasian standards of comparison were employed, in the present volume American standards are used. In the former book, it was stated that Great Britain was nearly equal in size to Victoria, and in another place was equal to one-third of the size of Cape Colony; in the latter, Great Britain is described as nearly twice the size of Newfoundland. France, formerly described as twice as large as Victoria, is now said to be equal in size to the combined areas of the New England States with New York, Pennsylvania, and Ohio. Ben Nevis, which was compared with the highest summits in Australia and New Zealand, is now compared with Mount Washington; and so on. In the general table of areas and populations, the area of the principal States of America and of the more populous countries in other continents is compared with that of Kansas as a general standard. We notice that the latest populations given in that table are for the year 1880 or thereabout, and not later. The portion of the book relating to America

in general, North America, and the United States, has been specially written by Dr. Leete, of the American Geographical Society. The other parts have been little changed from the form in which they appeared in Mr. Chisholm's well-known general *Geography*, though adaptations have been made here and there, as already indicated. The American portion is very well done, the principles laid down by Mr. Chisholm in his preface being generally observed, though there is an occasional tendency to go into too much detail. The book appears to have been printed partly from American type, and partly from English plates altered in America. In the emendations grammar has sometimes been sacrificed to the exigencies of space. In the South African edition, for example, we read that—

"It is owing to these influences that Great Britain and Ireland, though lying in latitudes in which in the Southern hemisphere cold and fog prevent almost all kinds of cultivation, enjoy a climate as mild as that of the cooler parts of the Australasian Colonies, and much more equable."

In the American edition this sentence is thus transformed :—

"It is to these influences that Great Britain and Ireland, though lying in latitudes in which in Eastern North America cold and fog prevent almost all kinds of cultivation, enjoy a climate as mild as that of New York and Pennsylvania, and much more equable."

The first edition of the present work obtained copyright in America in 1890. It would be interesting to know whether, having been produced in that way, it could obtain copyright under the recent Act. Not only is the character of the American type different from the English, but American spellings (harbor, favorable, labor, neighboring, etc.) are adopted in the earlier portion of the volume, while the English spellings (harbour, etc.) are used in the later portion. This may suggest to British authors that the plan of having their works put in type in America may not be without its drawbacks.

My Home in the Alps. By Mrs. Main. London : Sampson Low, Marston and Company, Limited, 1892. Pp. 131. *Price* 3*s.* 6*d.*

As Mrs. Main resides in Switzerland and is an experienced mountaineer, this little book may be accepted as an authority on matters relating to Alpine climbing. Mrs. Main's chapters on Guides are particularly valuable. She says she desires to dispel much ignorance on the subject, and to point out "the chief characteristics of a first-rate Alpine guide." The remaining chapters are devoted to other Alpine subjects, such as chamois, glaciers, moraines, avalanches, etc., and some of the authoress' Alpine adventures—the whole forming an admirable companion for the Swiss traveller or mountaineer.

NEW MAPS.

NORTH AMERICA.

UNITED STATES, Geological Survey of the ——. J. Powell, Director
Scale 1 : 62,500.

CONNECTICUT : Bridgeport, Derby, New Milford, Waterbury.

FLORIDA : Dunnellon.

ILLINOIS : Chicago, Desplaines, Riverside.

ILLINOIS-INDIANA : Calumet.

IOWA: Baldwin, Cedar Rapids, Davenport, De Witt, Durant, Maquoketa Mechanicsville, Monticello, Oxford, West Liberty, Wheatland.

IOWA-ILLINOIS: Clinton, Goose Lake, Leclaire.

MAINE: Biddeford, Buxton, Kennebunk, Newfield, Portland.

MAINE-NEW HAMPSHIRE: Berwick.

MARYLAND: Baltimore, Relay.

MARYLAND-VIRGINIA: Point Lookout.

NEW JERSEY: Bridgetown, High Bridge, Glassboro, Great Egg Harbor, Maurice Cove, Salem, Somerville, Tuckahoe.

NEW JERSEY-DELAWARE: Bayside.

NEW JERSEY-NEW YORK: Harlem, Paterson, Ramapo, Staten Island.

NEW YORK: Brooklyn.

NEW YORK-NEW JERSEY: Greenwood Lake.

PENNSYLVANIA: Catawissa, Easton, Hazleton, Lebanon, Lykens, Mahanoy, Pottsville, Scranton, Shamokin.

PENNSYLVANIA-NEW JERSEY: Wallpack.

VERMONT: Wilmington.

VERMONT-NEW HAMPSHIRE: Brattleboro.

WISCONSIN: Eagle, Stoughton, Sun Prairie, Watertown, Whitewater.

SCALE 1:125,000.

ALABAMA: Ashland, Clanton.

ARKANSAS: Batesville, Magazine Mountain, Marshall, Morrillton, Mountain Home, Mountain View.

CALIFORNIA: Bidwell Bar, Chico, Colfax, Downieville, Markleeville, Placerville, Pyramid Peak, Sacramento, Sierraville, Truckee, Wellington.

COLORADO: Albany, Apishapa, Arroyo, Big Springs, Catlin, Cheyenne Wells, Colorado Springs, Elmoro, Granada, Higbee, Kit Carson, Las Animas, Leadville, Mesa de Maya, Nepesta, Pueblo, Sanborn, Springfield, Timpas, Two Butte, Walsenburg.

GEORGIA: Gainesville, Marietta.

IDAHO: Camas Prairie.

KANSAS: Anthony, Caldwell, Cheney, Clay Center, Great Bend, Hutchinson, Kingman, Kinsley, Larned, Lyons, Ness City, Pratt, Spearville.

KENTUCKY: Hazard, Manchester, Salyersville.

NEVADA: Carson, Reno, Wabuska.

NEW MEXICO: Corazon, Lamy, Las Cruces, Las Vegas, Watrous.

NORTH CAROLINA: Wilkesboro.

VIRGINIA: Lexington, Palmyra.

WEST VIRGINIA: Charleston, Huntersville, Kanawha Falls, Nicholas.

TEXAS: Abilene, Albany, Anson, Ballinger, Cleburne, Dallas, Eastland, Fort Worth, Hayrick, Palo Pinto, Temple, Weatherford.

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE PYGMY TRIBES OF AFRICA.

By Dr. Henry Schlichter.

(*Continued from page* 301.)

Fourth Group.—*Dwarfs south of the Congo Basin: Bushmen and their Relatives.*—Investigations on the genuine Bushmen have become much more difficult than they were at the beginning of this century, because the rapid progress of European civilisation has driven this aboriginal race of South Africa to the north and north-west, and the genuine Bushmen have almost entirely disappeared from Cape Colony as well as from the Orange and Transvaal territories. In Griqua-, Nama-, and Bechuanaland they are still to be met with, but in very small numbers, whilst certain parts of the Kalahari desert and of the surrounding regions are the only territories where small hordes of genuine Bushmen may now be found in their original state. Half-breeds of Bushmen, Hottentots, Hill-Damara, and Bantu are met with in considerable numbers,[1] and many travellers have studied these, taking them for real Bushmen; and it is for this reason that we have many ethnological and linguistic accounts of the Bushmen which are often greatly at variance. This, of course, makes a critical investigation very difficult, and but little remains

[1] Such half-breeds are, *e.g.*, the Barwa and Masarwa of the eastern Kalahari, whom Holub regards as a mixture of Bakalahari and Bushmen. They are of medium height, of brown or black colour, and lead a life similar to that of the real Bushmen. Serpa Pinto says that they are usually regarded by Europeans as Bushmen; and we have, therefore, here one of the instances where the term 'Bushman' is used in an entirely misleading sense. Other half-breeds of this kind are the Madenassana, south of the Zambezi, the Hottentot-Bushmen of Great-Namaland, and various tribes and hordes which live among the Ovambo and Ovaherero. Whether the Gogoro, Kasarere, Bakangala, and others are genuine Bushmen or not I am unable to say, as we have no sufficient descriptions of them. Cust thinks that the Bakangala and the Kasekere, Kasekel, and Mucassequere are probably identical.

(ethnologically and linguistically) which can be regarded without suspicion or doubt. I have endeavoured carefully to limit myself to this class of observations; and I trust that the information thus obtained, although fragmentary, will form a reliable nucleus for further critical and comparative investigations.

Previous to the investigations of Fritsch and Hahn, it was generally assumed that the Bushman was merely a modification of the Hottentot, although Cuvier, more than seventy years ago, showed that this is not the case.[1] In the first place, we have to prove that the Bushmen are actually a dwarf race—a fact which is disputed by those who still hold the former opinion. Barrow, one of the best authorities on South Africa, describes them as a pygmy race of extremely diminutive stature.[2] He found the average height of the men to be 4·5 feet, and that of the women 4 feet. The tallest Bushman whom he met with measured not more than 4·8 feet. Lichtenstein, an equally well known traveller, states that the Bushmen are extremely small in stature, and gives the height of an average-sized adult as 4·3 feet.[3] Desmoulins regards them as the smallest branch of the human race,[4] Daniell describes them as diminutive persons,[5] and Arbousset says that their ordinary stature is a little above 4 feet.[6] Kretzschmar, who studied them for many years, found that their average height is between 3 and 4 feet,[7] and adds that they are, nevertheless, well-proportioned. Waitz remarks they average about 4 feet,[8] and Fritsch, who compared a number of them living in different regions, came to the conclusion that the average size of the various Bushman tribes is about 4·7 feet.[9] Schinz gives their average as 5·15 feet,[10] but this refers to only one or two small tribes living west of Lake Ngami, and his figures are therefore not of general application. Based upon these and other measurements, I have already determined the average height of the Bushmen of different tribes to be 4·5 feet.[11] It follows from this that the Bushmen are a pygmy race, similar in stature to the dwarfs of Equatorial Africa. But also in other respects the Bushmen show a great resemblance to the other pygmy tribes of Africa. Like the latter, they belong to that interesting group of the human race which Fr. Mueller and others have described as "tufty-haired,"[12] the hair of the head growing in curly tufts separate from

[1] Cuvier, *Mémoires du Musée d'Histoire Naturelle*, tome iii., 1817, p. 260.

[2] Barrow, *An Account of Travels into the Interior of Southern Africa in* 1797 *and* 1798, vol. i. pp. 277 and 279.

[3] Lichtenstein, *Reisen im südlichen Afrika*, vol. i., 1811, p. 187; vol. ii., 1812, p. 71.

[4] Desmoulins, *Histoire Naturelle des Races Humaines*, 1826, p. 309.

[5] Daniell, *Sketches Representing the Native Tribes of Southern Africa*, 1820, p. 30.

[6] Arbousset et Daumas, *Exploration au nord-est de la Colonie du Cap de Bonne Espérance*, 1842, p. 487.

[7] Kretzschmar, *Südafrikanische Skizzen*, 1853, p. 225.

[8] Waitz, *Anthropologie der Naturvölker*, vol. ii., 1860, p. 328.

[9] Fritsch, *Die Eingeborenen Südafrikas*, 1872, p. 397.

[10] Schinz, *Deutsch Südwest-Afrika*, 1891, p. 393.

[11] Schlichter, *The Geography of South-West Africa*, in the *Scottish Geographical Magazine*, Oct. 1891.

[12] Fr. Mueller, *Allgemeine Ethnographie*, 2 Auflage, 1879, p. 93: Haeckel, *History of Creation*, 1876, vol. ii. p. 311.

one another. Their skin is of a more or less yellowish-brown colour,[1] their hands and feet are small,[2] and their ears large,[3] all these features corresponding to those of the Akka and other Equatorial pygmy tribes. Also, their mode of living is in many respects similar. The genuine Bushmen are without exception nomadic hunters, who have not the least idea of agriculture and cattle-rearing—their chief means of subsistence being the produce of the chase, the smaller animals, and the roots and fruits of the desert.[4] Unfortunately, they do not confine themselves to the more or less barren plains of the Kalahari, but trespass on the pastures of the cattle-rearing Bantu and Hottentot tribes, as well as of the European colonists,[5] and their frequent raids upon the cattle of their neighbours have produced the deeply-rooted hatred of Bantu and Hottentots against these dwarfish aborigines of South Africa. Their dexterity and cunning in hunting equal those of the dwarfs in the forest region. They catch large and small animals in cleverly-arranged pitfalls and traps, or wound them with their deadly-poisoned arrows. Livingstone states that they kill many lions with their insignificant-looking arrows.[6] It is well known how they disguise themselves in an ostrich skin, in order to get within bow-shot of these shy birds. They form no communities, but live in families or in hordes,[7] usually ruled over by a chief, whose power is, however, very limited. As nomadic hunters, they have no fixed settlements, and never remain long at one place; but, as a rule, they confine themselves to certain districts, and carefully avoid intruding into the territory of the neighbouring Bushmen,[8] a custom likewise observed by the Equatorial dwarfs. The characteristic weapons of the Bushmen are bows and poisoned arrows, which are foreign to all other nations inhabiting these parts of Africa.[9] Their temporary huts consist of bushes or sticks set up against each other, and covered with grass, grass-mats, brushwood, etc.[10] Schinz says that the only vessels which he found in these primitive households were the shells of ostrich

[1] Daniell, *Sketches*, p. 30; Fritsch, *Eingeborenen*, p. 401; Schinz, *Südwest-Afrika*, p. 395; Moffat, *Missionary Labours in Southern Africa*, 1842, p. 4.

[2] Fritsch, *Eingeborenen*, p. 406.

[3] Fritsch, *Eodem loco*, p. 410; Schweinfurth, *The Heart of Africa*, vol. ii. p. 143.

[4] Schinz, *Südwest-Afrika*, pp. 391 and 395.

[5] Chapman, *Travels in the Interior of South Africa*, 1868, vol. i. p. 8.

[6] Livingstone, *Journal R. G. S.*, vol. xxi., 1851, p. 23.

[7] Fritsch, *Eingeborenen*, p. 386.

[8] Schinz, *Südwest-Afrika*, p. 389.

[9] I have already pointed out that the word *Batua*, as a designation of the pygmies, is used not only by the natives of the Great Equatorial Forest region, but also by other South and East African tribes. For instance, the Bushmen are called Batua by the Kafirs, Baroa by the Basuto, Basaroa by the tribes north of these, and Ovatua by the Ovaherero. It is not quite clear what the word *Batua* actually means. Hahn says that it signifies 'bowmen,' on account of their characteristic weapons, which are greatly dreaded by the Bantu. Schinz translates it by 'foreigners,' and says that Europeans are just as much *Ba wa* to these Bantu tribes as the Bushmen are. I quite agree with the latter scientist that the existence of the name Batua is no proof of the relationship existing between the Equatorial dwarfs and the Bushmen. Compare also: Hahn, *Die Buschmänner*, *Globus*, vol. xviii. 1870, p. 66; Fritsch, *Drei Jahre in Südafrika*, 1868, pp. 96-97.

[10] Chapman, *Travels*, vol. i. p. 60; Barrow, *Travels*, vol. i. p. 275.

eggs,[1] used for keeping water in, but Chapman states that some of them know the use of cooking utensils.[2] Their morals are said to be superior to those of the surrounding tribes, and although at first very shy of Europeans, they are afterwards found to be intelligent and trustworthy. We see that in most respects the Bushmen are exactly similar to the dwarf tribes of Equatorial Africa, but it must not be forgotten that certain differences also exist between the groups. Stanley and Schweinfurth describe the eyes of the Wambutti and Northern Akka as large and beautiful, whilst those of the Bushmen are small, deeply set, and restless, imparting to their countenance a savage expression. This difference is, however, not universal, as the Southern Akka whom Stanley discovered in the Great Forest have the same small, deeply-set, and malicious-looking eyes as the Bushmen. Moreover, the latter show no development of the lanugo, whilst many of the forest dwarfs, as we have seen, are covered with a thick growth of greyish hair; but also this distinction is only a partial one, as Schweinfurth describes the hair of the Akka as but slightly developed. The peculiar clicking sounds of the Bushman languages were not found by Lenz, Wolf, and other travellers in the languages of the Obongo and Batua, and Mr. Stanley informed me that the same is the case with the languages of the pygmies of the Great Forest. Certain differences in their mode of living, clothing, etc., are the direct consequences of the varied geographical and climatological characters of the countries which they inhabit, and other peculiarities of the Bushmen, *e.g.*, the steatopygy of the women, seem to be, as Fritsch correctly remarks, a sign of Hottentot mixture. Summing up, we cannot fail to recognise the fact that the differences between the Bushmen and the Equatorial pygmy tribes are of much less importance than the similarities existing between these groups, and Schweinfurth is perfectly correct in saying that, where the general similarity is so great, all minor discrepancies sink into insignificance.[3] About some anthropological details, as well as about our knowledge of the languages of both groups, I shall speak afterwards. The chief argument against the relationship between the more northern dwarfs and the Bushmen is that the two groups are geographically separated by widely extending territories, inhabited by a great number of tribes and nations of different origin. But this objection is untenable, as the existence of certain tribes has been proved which connect, geographically and ethnographically, the Bushmen with the other African dwarfs. Professor Ratzel points out that such connecting links cannot be looked for in the eastern parts of South and Equatorial Africa, where for centuries past numerous ethnological changes have taken place.[4] But he regards the Mucassequere, a peculiar tribe which Serpa Pinto discovered between the Cuando and Cuanavare, in about 20° E. long. and 15° S. lat.,[5] as a connecting link between the Bushmen and the other dwarfs. The Mucassequere are nomadic hunters, living

[1] Schinz, *Südwest-Africa*, p. 389.
[2] Chapman, *Travels*, vol. i. p. 60.
[3] Schweinfurth, *The Heart of Africa*, vol. ii. p. 142.
[4] Ratzel, *Petermann's Mitteilungen*, 1890, pp. 295-296.
[5] Serpa Pinto, *How I crossed Africa*, map, and vol. i. pp. 319-325.

among the Ambuella in the forests between the Cubando and Cuando. They are of similar colour to the Hottentots and Bushmen; their hair is crisp and woolly, growing in separate patches on their heads; their eyes are small; and their whole appearance is excessively ugly. Their only weapons are bows and arrows; they are entirely ignorant of agriculture: they have no dwelling-houses or settlements, but live in encampments, where branches of trees, bent downwards and interlaced in front, constitute their only shelter. They speak a language of their own, quite unintelligible to all the surrounding tribes. Serpa Pinto regards them as the lowest type of savages he ever met with on his journeys, and classifies them in the so-called Hottentot-Bushman group. Although his information is but very fragmentary, there can be little doubt that we have the connecting link between the Bushmen and the more northern dwarfs before us. This opinion is confirmed by Schulz' and Hammar's discovery of the Mossaro or Mossakere, a similar tribe more to the south—a fact to which I have already drawn attention in my paper about the geography of South-West Africa. The Mossaro were met with in about 17° 30′ S. lat. and 22° E. long.[1] They are of a yellowish-brown colour, and are described as hunters of Bushman-like appearance and habits. The Mucassequere and Mossaro are therefore ethnologically of the utmost interest and importance.

Other African Dwarfs.—Besides the previously described four great groups, other dwarfish or semi-dwarfish tribes must be mentioned, of whom we have a number of more or less trustworthy reports. Of some of them we cannot at present tell to which group they actually belong, or whether they are only local modifications of other African races. Mollien, in 1818, found the district of Tenda Maie, in the Western Sudan, inhabited by a variety of tribes, which he describes as the only remaining representatives of former African races, suppressed and well nigh annihilated by the conquests of the Mandingo and Fulbe.[2] Among these tribes, he discovered at Faran, on the Rio Grande, a small colony of undersized people, whom he regards as the real pygmies of Africa. About their customs and language nothing is stated, except that Mollien remarks that the inhabitants of Tenda Maie speak a different language from that of the surrounding tribes. It is impossible to say whether we have here the last survivors of the pygmy tribes, which in all probability lived twenty-five centuries ago on the banks of the Niger, or of some other river of the Sudan, or whether the inhabitants of Faran form only a local modification of one of the other Sudan nations. However that may be, Mollien's statement is of the highest interest to ethnologists.

I can attach but little importance to a remark of Escayrac de Lauture's about pygmies who are said to exist to the west of the hypothetical lake Koei-Dabo, a two months' journey to the south-east of Massena in Bagirmi.[3] They are called Mala Gilage, and

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[1] Schulz, *Erforschung der Chobe und Cubango Flüsse*, *Verhandlungen der Gesellschaft für Erdkunde zu Berlin*, vol. xii., 1885, p. 384.

[2] Mollien, *Voyage dans l'intérieur de l'Afrique*, 1820, tome ii. pp. 209-210.

[3] *Mémoire sur le Soudan*, *Bull. de la Soc. de Géogr.* 4e série, tome x. 1855, pp. 108 and 135.

are described as small-sized people of a reddish colour, and covered with a growth of hair. The natives say that they are men with tails. On account of the latter part of the statement the information must be rejected as unreliable, although the reddish colour of the skin and the growth of hair seem to indicate that the report may refer to some genuine observation.

Much more trustworthy are the reports of Koelle, which he obtained from natives while preparing his admirable *Polyglotta Africana* at Sierra Leone.[1] In the country of Lufum, and also on the shores of a lake called Liba, is said to exist a tribe of dwarfs called Kenkob, who are described as being 3 or 4 feet high. They are said to live on the produce of the chase and to be excellent marksmen. In the Rufum country and on the river Riba, flowing through the countries of Bansa and Bambongo, there is a small tribe of bearded pygmies, from 3 to 5 feet in height, called Betsau, who are hunters like the Kenkob. They lead a nomadic life and do not cultivate the ground. Riba and Liba, as well as Rufum and Lufum, are evidently synonymous terms which refer in all probability to the Congo or one of its tributaries, where the country of these dwarfs must be looked for.

Another small group of natives, the Watua or Wata, who are not actual dwarfs, but closely allied to them, must be mentioned here. They are found in two widely-separated countries of East Africa, viz., near Delagoa Bay, and also more to the north on the Swahili coast, where they live among the southern Galla tribes in the districts near Tagaungu.[2] According to New, the Watua and Wasania are identical.[3] This interesting group—about the northern branch of which we possess some reliable information—reminds us in various respects of the Central African pygmies. Like them they are expert hunters, and live exclusively on the produce of the chase. Their weapons are bows and arrows, and, although they have some few fixed settlements, yet they generally lead a migratory life, dwelling in temporary encampments where they build beehive-like huts. Ethnologically they are totally different from the Galla among whom they live. They speak the Galla language, and, according to New, they know no other, but Krapf asserts that they have also a language of their own which is entirely different from all Galla dialects.

Cust speaks of another tribe belonging to the pygmy group which, according to Last, lives about three months' march north-west of Nguru. Last gives them the name of Wamdidikimo.[4] On Stanley's map of 1878 a pygmy tribe called Wabilikimo is placed in 3° S. lat. and 35° 30′ E. long. This reminds us at once of the Waberikimo of Boteler, Avanchers, and Krapf, whom we have mentioned in connection with the Doko and other East African pygmies. The few observations, however, which we possess at present about them, are not

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[1] Koelle, *Polyglotta Africana*, p. 12.

[2] Cust, *Modern Languages of Africa*, vol. ii. 1883, p. 448.

[3] New, *Life, Wanderings and Labours in Eastern Africa*, 1874, p. 278 *sqq.*

[4] Last, *Proceedings R.G.S.*, 1882, p. 226; Cust, *Modern Languages*, vol. ii. p. 451.

sufficient to authorise us to speak definitely about this tribe as a more southern branch of the East African pygmies.[1]

Quite recently a pamphlet was published, entitled *The Dwarfs of Mount Atlas; statements of natives of Morocco and of Europeans residents there as to the existence of a dwarf race south of the Great Atlas*, by R. G. Haliburton. As the author of this pamphlet has informed me that he is in possession of further material concerning this question, I shall suspend my judgment till after the publication of this new evidence.[1]

Some Anthropological, Anthropogenetic, and Linguistic Remarks.—Professor Flower, in an admirably-written paper,[2] gives a full description of the two Akka skeletons which Emin Pasha sent to London some years ago, thereby definitely settling the dispute which, since Schweinfurth's discovery of the Akka, had been going on about the osteological peculiarities of these pygmies. He has proved that the cranium of the Akka is shorter and rounder than is generally the case with Negroes, and although a tendency towards brachycephalism exists, Schweinfurth's opinion that the cranium is almost spherical is incorrect. Further, the cranium shows a considerable degree of prognathism. The skeletons also prove that the Akka belong to the smallest representatives of mankind, and that they show in all essential characteristics the type of the negroid branch of the human race. But I cannot agree with Professor Flower in his comparative remarks about the Akka and Bushmen, as his observations about the latter differ so greatly from those of Fritsch—who, as is generally acknowledged, is our best authority upon the genuine Bushmen—that I have been greatly puzzled how to explain Professor Flower's differing statements. However, having studied the Bushman skeletons in the Royal College of Surgeons, to which Professor Flower refers, I have found that none of these,[3] and, moreover, none of the crania, etc., in the Barnard Davis Collection,[4] can be proved to have belonged to genuine Bushmen, as no information whatever about the tribe or country where they came from is forthcoming. All that we know about the origin of these specimens is that two of the skeletons were sent from a hospital in Capetown, a fact which makes it very doubtful whether we have the skeletons of genuine Bushmen before us. The crania of the Bushmen are described by Fritsch as large and broad, and showing a high degree of prognathism, whilst Professor Flower speaks of their peculiar oblong form and the absence of prognathism. Again, speaking of the external appearance and the osteological characters of the Bushmen, Professor Flower says that their only near allies are the Hottentots, whilst Fritsch has conclusively proved that the genuine Bushmen differ in these respects altogether from the latter. It is further stated that the yellow complexion of the Bushmen is unlike that of the Akka, whilst we know from various

[1] Other tribes, like the Wandorobbo, Wanena, and Wapangwa, are in all probability ethnographically identical with the tribes among whom they live.

[2] Flower, *Descriptions of two Skeletons of Akka, Journal of the Anthropological Institute of Great Britain*, vol. xviii., 1889, pp. 3-19; compare also Flower, *The Pygmy Races of Men, Eodem loco*, pp. 73-91.

[3] Compare the catalogue of the Royal College of Surgeons. Part I., 1879, pp. 246-247.

[4] Davis, *Thesaurus Craniorum*, 1867, p. 216-217.

travellers that the colour of the skin is in both cases of a characteristic yellowish-brown shade. About steatopygy, etc., I have spoken above, and as regards the assertion that although individual Bushmen were found to be very small in stature, yet the Akka are considerably shorter than the Bushmen, I have to reply that many travellers, *e.g.*, Barrow, Lichtenstein, and others, have based their view about the dwarfish size of the Bushmen upon a great number of measurements, and by no means upon single individuals. All this leads me to the conclusion that Professor Flower is not describing the genuine Bushmen, but rather a Hottentot mixture. Therefore, his conclusion that the Akka differ from the Bushmen is by no means justified, and the existing similarities between the Equatorial dwarfs and the genuine Bushmen are, as we have seen, so striking, that, in spite of our fragmentary osteological knowledge of the latter, the relationship of the groups can hardly be doubted.

Various authors have brought forward the hypothesis that the pygmy tribes of Africa are the remnants of the original population of that continent, but I must emphatically state that such an assumption is at the present time unsupported by any direct observations, although this hypothesis recommends itself strongly by the fact that it is most unlikely that the various scattered pygmy tribes immigrated into territories already occupied by the Bantu, Nuba, and Hottentot races. On the other hand, it has been said that the pygmies are merely degenerate specimens of the tribes among which they live, the Obongo, for instance, being degenerate Ashango, the Akka degenerate Monbuttu, and the Bushmen degenerate Hottentots. It is, however, utterly impossible to uphold this latter view, as the anthropological and ethnological differences between the various pygmies and their full-sized neighbours are far greater than the differences which exist between the pygmies themselves. Our best authorities on the pygmies, viz., Stanley, Wolf, Schweinfurth, and others, have strongly objected to the assumption that we have in the pygmies degenerate Bantu and Nuba, but it is of course quite natural that frequent intermarriages with these races should have produced half-breeds showing in some respects the characteristics of the pygmies, and in others those of other races. Such a race are Casati's Monbuttu Tiki-Tiki, as already mentioned, and many difficulties which puzzle us at present about the Bushmen, Akka, and others, are doubtless the result of this fact. That the degeneration hypothesis is incorrect is further proved by the wide extension of the pygmy tribes over the greater part of Africa, as well as by the fact that more or less similar tribes, which belong to the same branch of the human race, are the aborigines of certain islands lying in the Indian Ocean, or still more to the east. Professor Haeckel in his *Anthropogenie* and *History of Creation*[1] suggests that the primeval home of man was a continent, now sunk below the surface of the Indian Ocean, which extended from Africa and Madagascar to Further India, the Sunda Islands and Melanesia. Various problems of natural history and anthropology would find an easy solution, if this suggestion

[1] Haeckel, *Anthropogenie*, 3. Auflage, 1877, p. 521 ; *History of Creation*, 1876, vol. ii. p. 326.

could be conclusively proved. One of these problems is the origin of that peculiar branch of the human race which includes not only the Bushmen and the Hottentots, but also the Melanesians, Andamanese, and the now extinct aborigines of Tasmania.[1] Besides the Bushmen we have to add to them the other African pygmy tribes. The Andaman islanders are a dwarfish race, differing, however, considerably from the African pygmies, as Professor Flower has proved. Another pygmy race, the Kimo, are said to exist in Madagascar, but we know very little about them, and the extinct Tasmanians are described as having been on the average a little above 5 feet high. Hence, we see that the small-sized tribes of this branch of mankind are not limited to Africa, and Hamy appropriately gives to the African pygmy tribes the collective name of *Negrillos*,[2] analogous to *Negritos*, the small, round-headed race more to the east. Darwin's, Huxley's, and Haeckel's investigations about the origin of man point to the antiquity of these races, and although our information is at present too meagre and fragmentary to warrant us to compare the Negrillos and Negritos with the anthropoides, yet the diminutive size, and especially the development of the lanugo with many African pygmies, *e.g.*, the Obongo, Wambutti, and Akka, are of the highest interest in this respect.

We know but very little about the languages and dialects of the Bushmen and of the other African dwarf tribes. A few short vocabularies of the latter, collected by Stanley, Wolf, Du Chaillu and Lenz, are all that we can compare at present with the equally incomplete Bushman vocabularies of Hahn, Bleek, Lichtenstein, Schinz and Arbousset. Many words which the Equatorial dwarfs use are adopted from their Bantu neighbours, but all travellers affirm that the dwarfs have also languages of their own, and the vocabularies show that the characteristic pygmy words are different from the languages of the surrounding Bantu population. After eliminating the Bantu elements, I had less than thirty words left for a comparison with the very incomplete vocabularies of various Bushman dialects. This was quite insufficient to draw any reliable conclusions, but as some of these words are evidently identical, I shall give them in the accompanying footnote.[3] About clicks I have

[1] Compare Flower, *The Aborigines of Tasmania*, *Manchester Science Lect.*, series 10, p. 49 *sqq.* ; *Two Akka Skeletons*, *Anthrop. Inst.*, 1889, p. 3-19 ; *Pygmy Races of Men*, *Eodem loco*, pp. 73-91.

[2] Hamy, *Essai de coordination des matériaux récemment recueillis sur l'ethnologie des négrilles ou pygmées de l'Afrique équatoriale*, *Bull. de la Soc. d'Anthr. de Paris*, 3e. série, tome ii. pp. 79-101.

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	Languages of the Equatorial Dwarfs.	Bushman Languages.
Water	akko (Stanley, *Darkest Africa* : Bakiokwa dialect).	kho (Hahn : Baroa language).
Eye	koi (Stanley : Bakiokwa dialect).	† kai (Schinz, *Südwest-Africa* : ‖ Ai dialect).
Foot	maguru (Stanley : Mbarukukaru dialect).	† goro (Schinz : ‖ Ai dialect).
Hut	n'duh (Wolf, *Im Innern Afrikas* : Southern Batua language).	! nu (Schinz : ‖ Ai dialect).
Small	kokoa (Wolf : Southern Batua language).	/ goa (Schinz : ‖ Ai dialect).

spoken already. Those linguists who regard exclamations, interjections, and the like, important in the study of languages, I may refer to Du Chaillu's observations among the Obongo.

African Pygmies of Antiquity.—Already in the course of my investigations about Ptolemy [1] I have pointed out that I attach no scientific importance to the numerous legends which have been current from the earliest times about these inner African dwarf tribes,[2] but that, on the other hand, we should not ignore what several trustworthy ancient authors wrote about them.[3] Herodotus tells us that Sataspes, at the farthest point of his journey on the west coast of Africa, found the coast occupied by a dwarfish race who wore a dress made from the palm tree.[4] I do not venture to connect this report with the undersized inhabitants of Faran whom Mollien met on the Upper Rio Grande. But, nevertheless, this information is not without interest, especially when we compare it with another report which is likewise contained in Herodotus, viz., of the well-known journey of the five Nasamonians into the interior of Africa.[5] Vivien de Saint Martin believes that these Nasamonians never crossed the Sahara, but only reached Wargla.[6] His arguments, however, are not convincing, and the report, as given by Herodotus, can only refer to the Sudan, the great river flowing eastward being either the Niger or one of the rivers in connection with Lake Chad, *e.g.*, the Bahr-el-Ghazal. On the banks of this river lived dwarfish men, under middle height, who spoke a language unintelligible to the Nasamonians. Of this pygmy race no trace has been found in modern times. We know that for centuries past numerous ethnographical changes have taken place among the savage and the semi-civilised inhabitants of the Western Sudan, and it is therefore probable that the dwarfish aborigines whom the Nasamonian travellers met on the banks of the said river have disappeared long ago, whilst their more southern relatives found refuge in the impenetrable forest regions of Equatorial Africa.

Pomponius Mela,[7] a Roman geographer of the first century of the Christian era, speaks of other pygmies, whom he places in the interior of East Africa to the west of the Gulf of Aden. Between them and the coast he places a tribe called Panchai, who are no doubt identical with a tribe mentioned by Ptolemy and dwelling in the same locality, viz.,

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[1] Schlichter, *Ptolemy's Topography of Eastern Equatorial Africa*, *Proceedings R.G.S.*, Sept. 1891.

[2] Monceaux (*La Légende des Pygmées et les Nains de l'Afrique Équatoriale*, *Revue Historique*, vol. xlvii., Sept.–Oct. 1891, pp. 1-64) has recently given a complete account about the pygmy legends of antiquity. His careful investigations are a valuable contribution to the historical part of the pygmy question.

[3] Also the few extant remarks of Hecataeus (see *Eustathii Commentarii ad Homeri Iliadem*, vol. i., 1827, pp. 301-302; and Müller, *Frag. Hist. Graec.*, vol. i. p. 18) and Philostratus (*Apollonius von Tyana*, Baltzer's edition, 1883, p. 230, book vi. c. i.) about the pygmies, are of no scientific value.

[4] Rawlinson's ed. of *Herodotus*, vol. iii., 1875, p. 35.

[5] *Eodem loco*, vol. ii. pp. 50-51.

[6] Vivien de St. Martin, *Le Nord d'Afrique dans l'Antiquité*, 1863, pp. 18-19.

[7] Pomponius Mela, *De Chorographiâ libri tres*, lib. iii. c. 8.

the Pechini. According to the latter geographer, the Astapus (Blue Nile) flows to the west of the country of the Pechini, and the pygmies of Pomponius Mela must, therefore, be looked for beyond this river—*i.e.* either west or south of it. This brings us into the neighbourhood of those territories which, according to Harris, Avanchers, Hartmann, and others, are inhabited by an East African dwarf race, as above explained. Although we are thus able to fix approximately the locality of the pygmies of Pomponius Mela, and although his statement seems perfectly trustworthy, yet there is no corroborative evidence of them to be found, and therefore I simply state the facts without drawing any conclusions therefrom.

I have proved in a previous publication that the Ancients had not merely a vague knowledge of the Upper Nile regions, but were acquainted with the course of the Nile far beyond the confluence of the White and Blue Rivers. It is, therefore, not difficult to understand that they might have had either direct or indirect information about the pygmy tribes living in the source region of the Nile. That this was actually the case follows plainly from the words of Aristotle, who states that the pygmies live near the lakes from which the Nile flows; "and this is no fable, for there is really, as it is said, a race of dwarfs, both men and horses, which lead the life of troglodytes."[1] Pliny affords corroborative evidence in saying that, according to different authors, the Nile has its origin in several lakes, between which is the country of the pygmies.[2] Strabo also has a passage on this subject. He says:—"The mode of life (of the Ethiopians) is wretched; they are for the most part naked, and wander from place to place with their flocks. Their flocks and herds are small in size, whether sheep, goats, or oxen; the dogs also, though fierce and quarrelsome, are small. It was, perhaps, from the diminutive size of these people that the story of the pygmies originated, whom no person worthy of credit has asserted that he himself has seen."[3] Now, it is a curious fact that the natives in the neighbourhood of Gondokoro and Lado, on the Upper Nile, have small-sized domesticated animals, and Sir Samuel Baker, in his book about the discovery of the Albert Nyanza, describes them as follows:—"The cattle are very small; the goats and sheep are quite Lilliputian."[4] I have already pointed out that Strabo's denial of the existence of the pygmies is merely an objection to the name, as he speaks about small-sized tribes immediately afterwards, and this, as well as Aristotle's and Pliny's information, can leave no reasonable doubt that the Ancients had some knowledge about the existence of that branch of the dwarf tribes of Inner Africa which the greatest of all African explorers, Stanley, discovered on the banks of the Semliki Nile, near the Mountains of the Moon and the sources of the Nile of antiquity.

I must add a few words about a geographical fragment[5] which

[1] Aristotle, *Hist. Animal.*, viii. 2.

[2] Pliny, *Hist. Nat.*, vi. 35.

[3] Hamilton and Falconer's ed. of *Strabo* (Bohn's Classical Library), vol. iii., 1857, p. 270.

[4] Baker, *The Albert Nyanza*, 1866, vol. i. p. 91.

[5] Compare Cooley, *Ptolemy and the Nile*, 1854.

belongs to the fifth or a later century of the Christian era. It contains a description of the source region of the Nile. I cannot here enter into a discussion how far the unknown author of this fragment has copied or amplified Ptolemy and other geographers; but if we regard, as Ganzenmüller correctly does, the Crocodile Lake as identical with the Victoria Nyanza, we find that the pygmies who are mentioned in two passages of the fragment are placed in the same localities as those of Aristotle and Pliny. Dr. Felkin[1] reports that he met with a dwarf at Rohl, who told him that he came from a far country inhabited by pygmies, who live among mountains the tops of which are always white; and the late Captain Stairs, who carefully studied the pygmies on the Upper Aruwimi and Nile, informed me that in every large tribe of Central Africa dwarfs are kept, either as curiosities or for their powers of tracking and bushcraft, and that, he believes, they found their way in ancient times to Egypt, and may have given some information about the Mountains of the Moon and the sources of the Nile. I have no doubt that this is correct, especially in the face of a highly important discovery which Mariette made, who found on one of the old Egyptian monuments the picture of a dwarf and the name of *Akka* by the side of it.[2]

I may be permitted to remark that the more I study and criticise the still extant information of the Ancients, the more I am surprised how great—in spite of many errors and inaccuracies—their actual knowledge of Africa was. Of course we must be very careful and critical, but I think I have proved that in many cases we are in possession of facts which no reasonable critic can disregard or deny. The African pygmies are an example of this, and besides, it is very pleasing for me to see that, at least in this instance, Calliope is in harmony with dry nineteenth-century science, finding some truth in the words of the greatest of Greek poets who sang many centuries ago:[3]—

> . . . 'When inclement winters vex the plain
> With piercing frosts, or thick-descending rain,
> To warmer seas the cranes embodied fly
> With noise, and order, through the midway sky;
> To Pygmy nations wounds and death they bring,
> And all the war descends upon the wing.'

I cannot conclude without tendering my most sincere thanks to our greatest African authority, Mr. H. M. Stanley, for his kindness in giving me many valuable hints concerning the ethnology of the pygmies living in the Great Forest and on the Semliki Nile.

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[1] Felkin-Wilson, *Uganda and the Egyptian Sudan*, 1882, vol. ii. pp. 141-142.

[2] Hamy, *Essai de coordination, etc.*, *Bull. de la Soc. d'Anthr. de Paris*, 3e série, tome ii. p. 97.

[3] *Iliad*, iii., Pope's translation.

RECENT RESEARCHES IN PLEISTOCENE CLIMATE AND GEOGRAPHY.[1]

THE existing climatic and geographical conditions of Europe, as we learn from geology, are the final results of many antecedent changes. The present has been slowly evolved out of the past. Geographers, therefore, cannot but be interested in the history of the period that immediately preceded that in which we live. Indeed, the lecturer remarked, it might be truly said, that without some knowledge of its conditions we could hardly hope to understand many of the more remarkable physical features of this and other temperate regions of our hemisphere. No apology, therefore, was required for bringing before the attention of a geographical society the general results obtained from a survey of recent researches into the history of what is known to geologists as the Pleistocene, or Quaternary, period. The records of that period consist for the most part of those more or less unconsolidated accumulations of gravel, sand, clay, peat, etc., underneath which the so-called solid rocks are to a large extent concealed. These formations form the mere skin, as it were, of the lithosphere; but their importance is out of all proportion to their bulk, seeing that it is in them we meet with the earliest traces of man.

To understand Pleistocene geology it was not necessary to deal with the origin of the larger features of our land. There could be no doubt that all our mountains and valleys had come into existence before Pleistocene times; to treat of their evolution we should be compelled to go back to a very early geological period indeed. By the beginning of the Pleistocene period all, or nearly all, the leading features of our land had already come into existence. But many changes of climate and many oscillations of sea-level have taken place since then, and it was to the history of these later changes that the lecture was devoted.

Before beginning the story of the Pleistocene period it was necessary to glance first at the conditions that characterised the immediately preceding age, known to geologists as the Pliocene period. In early Pliocene times it would seem that the North Sea occupied a somewhat wider area than at present. Most of Belgium and Holland were then under water, and the eastern and southern districts of England appear likewise to have been submerged. The climate, as inferred from the general aspect of the marine fauna, was warm-temperate. It could hardly be doubted, indeed, that the North Sea had then a wider communication with southern waters than is now the case. By and bye, however, the sea began to retreat from the land, so that, eventually, open and direct connection with more southern waters was cut off. England was at the time in question connected with the Continent, and inhabited by such mammals as the mastodon, elephant, horse, deer, etc. The climate still continued genial, but was gradually becoming less so. This we learned

[1] Abstract of a Lecture to the Royal Scottish Geographical Society, on May 18th, 1892, by Professor James Geikie, D.C.L., LL.D., F.R.S.

from the fact that in the oldest beds of the Pliocene all the fossils that belong to still living species are exclusively southern in their range; while as we pass from the lower to the higher beds northern types gradually replace the southern forms; until at last, in the upper marine deposits, the whole facies of the fauna becomes decidedly arctic. The highest members of the Pliocene system are certain estuarine and fresh-water beds, which have yielded a large number of plants and mammalian relics. The former indicate a climate not unlike that now experienced in the east of England, while the mammalian fauna, embracing the hippopotamus, elephant, rhinoceros, etc., has a markedly southern aspect. Now it had been ascertained beyond reasonable doubt that these fresh-water and estuarine accumulations are the alluvia of the ancient Rhine; so that in Pliocene times the following succession of changes took place:—(1) warm-temperate conditions—the North Sea occupying a wider area than at present; (2) gradual deterioration of climate; (3) open communication between the German Ocean and more southern seas cut off, while the southern marine fauna were gradually exterminated, and their places occupied by a boreal and arctic fauna; (4) conversion of the southern portion of the North Sea into dry land—the Rhine flowing north over the new land-surface. The climate in England at that time was temperate or genial.

These changes brought us to the threshold of the Pleistocene period. Immediately above the old Rhenish alluvia in East England comes a stratum of flood-loam and sand charged with the remains of an arctic flora, comprising the arctic willow and birch and some boreal and high-alpine mosses. Obviously there is a break or lacuna between the Rhenish alluvia and this earliest Pleistocene flood-loam. We could not suppose that the climate changed suddenly from temperate to arctic. Some time must have elapsed before the genial temperature indicated by the Rhenish flora and fauna was replaced by a climate resembling that of northern Lapland. These severe conditions, however, became intensified, for in the succeeding accumulations we encounter the boulder-clays or ground-moraines and associated sands and gravels of a great ice-sheet or *mer de glace*.

But before attempting to trace the glacial succession in Britain, it was advisable to consider shortly the history of Later Pliocene times on the Continent. In Central France, then, the Upper or Later Pliocene deposits rest upon, and are covered by, morainic accumulations, and the same is the case in the Alpine Lands and North Italy. One of the most characteristic mammals of the Upper Pliocene—*Elephas meridionalis*—occurs in the Rhenish alluvia of East England, and has been obtained also from contemporaneous deposits in Central France and North Italy. Great climatic changes, therefore, had taken place in Europe before the formation of the oldest boulder-clay hitherto met with in our islands. Thus in Switzerland during late Pliocene times the snow-line had become depressed to such an extent that vast glaciers filled all the mountain-valleys and flowed out upon the low grounds at the foot of the Alps. Thereafter the climate again became genial—the glaciers retreating to the very heads of the valleys and mountain-ridges—and a flora,

comparable to that which now characterises the Mediterranean and Black Sea regions, occupied such mountain-valleys as those of the Inn and the Serio. The Glacial Period, therefore, commenced in Pliocene times, the oldest moraines of the Alps being on the horizon of the arctic marine beds of the English Pliocene; while the Rhenish alluvia of East Anglia are the equivalents in age of the Pliocene lignites, etc., of the Alps and Central France.

Returning now to the Pleistocene deposits of Britain and Northern Europe, it had for some time been admitted that in those deposits we have the records of two separate glacial epochs, with an intervening stage of mild or temperate condition. Recent investigations, however, had shown that the climatic changes of the Pleistocene were more complex than had been supposed. In Britain, for example, we have three separate and distinct series of ground-moraines. The lowest of these, known generally as the "lower boulder-clay," is the moraine of a vast *mer de glace*, which marked the epoch of maximum glaciation. During its formation the major portion of the British Islands and a vast region in Northern Europe were smothered in ice. This inland ice occupied the basin of the North Sea, and extended for many miles beyond the Outer Hebrides and the Orkney and Shetland Islands, into the Atlantic and Northern Oceans. It reached south to the valley of the Thames in England, and to the foot of the hills of Middle Germany.

The disappearance of this vast sea of ice was followed by a return to temperate climatic conditions. Again a temperate flora covered northern and central Europe, while elephants, hippopotamus, rhinoceros, and many cervine and bovine animals ranged into North Germany and England. The British Islands were at this time joined to the Continent. Eventually these genial conditions began to pass away, and at the same time submergence ensued, but to what extent we could not tell—probably not more than a few hundred feet in Britain.

Glacial conditions then re-appeared, and once more a great ice-sheet occupied wide regions in Britain and Northern Europe. But this ice-sheet did not cover quite so extensive an area as its predecessor. It reached as far south in Britain as the Midlands of England—Scotland being almost as deeply covered as during the preceding epoch of maximum glaciation. The British ice-sheet was confluent, as before, with that of Scandinavia. It was underneath this ice-sheet that our so called upper boulder-clay was formed. It is not yet known how far south in Middle Europe this ice-sheet extended, but there is reason to believe that it did not reach the limits attained by its predecessor. Nevertheless, it overflowed all Northern Germany, and extended south-east as far at least as Moscow.

Next ensued another mild epoch, when the big ice-sheet melted away, and a wider land-surface obtained, as before. The climate then became genial, and nourished an abundant temperate flora, the relics of which are met with at many places between the shores of the North Sea and Eastern Prussia. The conditions appear to have been even more genial, or at all events less continental and more insular, than are now experienced in Middle Europe. The elephant and other large mammals

again occupied the land. By and bye these genial conditions began to change and a colder climate to prevail, and at the same time the maritime tracts of Britain became submerged—the submergence in Scotland reaching to a little more than 100 feet below the present sea-level.

Glacial conditions now once more supervened. The mountainous districts of Britain were covered with great snow-fields, from which large glaciers descended all the mountain-valleys to the low grounds, where in some places they became confluent, so as to form local ice-sheets. Glaciers at the same time occupied our sea-lochs and calved their icebergs there. Many of the Scottish islands at this time nourished little glaciers, which, in like manner, flowed down to the coast and set icebergs adrift. Much floating ice was thus present in our seas, while an arctic fauna lived round our coasts. The moraines of this period are in many places found resting on the surface of what are now raised sea-beaches. Scandinavia at this time was covered by inland ice, from which icebergs were detached along the whole west coast of Norway. In the extreme south of the peninsula, however, the inland ice deposited its moraines upon the coast-lands. Finland was similarly ice-covered—the terminal front of the ice reaching nearly to Lake Ladoga—while the basin of the Baltic was occupied by a great glacier, which fanned out upon the coast-lands of North Germany, and invaded Denmark and Schleswig-Holstein.

Eventually these glacial conditions vanished as before, and were gradually replaced by a temperate climate. With the advent of this better climate we might note that the sea again retreated from the coast-lands, and the British Islands became continental. At first the land was occupied by an arctic-alpine flora, but this in time gave place to an assemblage of plants like that of the present day. As the epoch reached its climax vast forests of oak and other deciduous trees with coniferous forms overspread wide regions in Northern Europe, extending into latitudes where trees will not now grow, and reaching elevations on the mountains which are not attained by the same trees in our day. These genial forest conditions were next succeeded by partial submergence, and a cold wet climate supervened. The sea-level in Scotland then stood some fifty feet higher than at present. Enormous quantities of drift-wood were floated down to sea, and much of this became entombed in the estuarine deposits of the period. Peat-bogs now flourished, and wide areas of the old forest lands were eventually occupied by the bog-moss and its allies. At the same time snowfields of considerable size existed in the mountains, and here and there glaciers descended to the sea and dropped their moraines there. These are now seen resting on the surface of our 50-feet beach.

The subsequent changes in Britain were next summarised. When the sea retreated from the 50-feet level it retired to a considerable distance. In other words, the land again spread far into regions which are now submerged. It is not known, however, whether the British Islands again became continental. But with this increased extension of land-surface the climate improved as before, and the forests once more attained a great development—much of the peat-covered area becoming afforested. Thereafter submergence followed, the sea advancing to a height of 25-30 feet above its present level. The climate at the same time became wet

and ungenial, and the forests decayed as before, and were buried in the flourishing peat-bogs of the period. But whether any local glaciers existed at this time had not been ascertained. Lastly, the sea retreated to its present level, and the climate became drier and more genial.

Turning now to the Continent to see whether there is any evidence of similar climatic oscillations having taken place in latitudes corresponding to our own, we learned that in the Low Countries, in Denmark, in Norway and Sweden, etc., at least two epochs of forest-growth have been recognised, the epochs in question having been separated and followed by wet, ungenial conditions.

Summing up the general results of this inquiry, it was found that in late Pliocene times a great cycle of climatic oscillations began, and continued down to a geologically very recent period. Cold and genial conditions seem to have alternated with strange regularity. It might be noted, however, that glacial conditions early attained their maximum developments. It was during the second cold epoch that a great *mer de glace* flowed south to the foot of the Harz. The later cold epochs became successively less severe. It was further to be observed that the earliest inter-glacial epoch appears to have been characterised by exceptionally genial conditions. During succeeding inter-glacial stages the climate of Europe continued to exhibit the same character, but in a less pronounced degree.

It was remarkable that in the Alpine Lands a similar succession of climatic changes had been recognised. Thus, according to Professor Penck and others, the Alpine glaciers have experienced five epochs of special development, of which the first three were the most important. During each of these epochs the glaciers filled all the mountain-valleys, and flowed far out upon the low grounds at the base of the Alps, the second of the great glacial invasions being the greatest. Thus the maximum epoch of glaciation in the Alpine Lands coincided with the similar epoch in Northern Europe; it was the second of the series. During the fourth cold epoch—corresponding to the epoch of large local ice-sheets in Britain and the great Baltic glacier of the Continent—the Alpine glaciers filled the large longitudinal valleys of the Alps, but did not reach the low grounds. The last cold epoch—equivalent to our stage of local glaciers and the 50-feet beach—was marked by the presence of large glaciers in the higher valleys of the Alps.

One of the most remarkable phenomena connected with the history of the Glacial Period was the persistency with which cold climatic conditions were heralded and accompanied by submergence; while, on the other hand, genial conditions seem always to have been associated with a retreat of the sea and a consequent gain of land. Again and again Britain became continental during the prevalence of a genial climate—the sea advancing as soon as the climate began to deteriorate and colder conditions to supervene. The cause of these geographical changes was one of the most perplexing with which geologists have to deal, and no satisfactory explanation of the phenomena had yet been advanced.

The latter part of the address was taken up with an account of the physical features of this and other lands which owe their origin to glacia-

tion. Under this head were discussed the origin of lake-basins and the contour or configuration of low grounds and high grounds. It was shown to what an extent the various drainage-systems of the country had been modified by glacial erosion and deposition—some of the most charming features in the scenery of Scotland having resulted more or less directly from glacial action.

The lecture was illustrated by a number of geological diagrams and maps, of which we reproduce one (see Plate). This map shows the ice-covered areas of Northern Europe at two separate periods : namely, the period of maximum glaciation (= the second glacial epoch) and the period of the Great Baltic Glacier and the Local Ice-sheets of Britain (= the fourth glacial epoch).

M. HENRI DAUVERGNE'S EXPLORATIONS IN THE PAMIRS.

By C. E. D. Black.

An interesting paper by M. Dauvergne on his explorations on the northern frontiers of Kashmir in 1890 has just been printed in India. It is a translation of a paper read before the Paris Geographical Society and to be published in the *Bulletin*, and its detailed character makes it far more valuable than the brief notes on the journey hitherto published in Europe. M. Dauvergne states that he started in June 1889 for the Pamir, from the south, *via* Ladak and Yarkand. He wanted to reach the Kuen Lun mountains and the southern Pamirs, Sarikol, and Taghdumbash, and, if possible, return before the winter or in early spring. The road he followed was by way of Khardung, the river Shyok, the Sasar La and Karakoram passes, a route known to us from the surveys of Sir Douglas Forsyth's expedition, and remarkably difficult owing not only to the badness of the track, but also to the absence of fodder for the ponies. At a spot about 300 feet below the Karakoram Pass, the scene of the murder of poor Mr. Andrew Dalgleish, M. Dauvergne erected a truncated pyramid of stones surmounted by a pillar of white marble, bearing in Arabic and English the inscription :—'Here fell Andrew Dalgleish, assassinated by an Afghan.' To the north a few snow antelopes (*Kemas Hodgsoni*) were killed, forming a welcome addition to the larder. These animals are not to be found below an altitude of 16,000 feet. They are very good eating, and have very graceful horns shaped like a lyre. At Suget a halt was made on the banks of the Karakash, and pack-saddles, shoes, etc., were overhauled. A letter was also received here from M. Petrovsky, the Russian Consul at Kashgar, recommending the party to come straight on to that city without fear of the Chinese. M. Dauvergne proceeded as far as Kilian, which is the frontier of Chinese Turkistan, but at Namlung he left the caravan route and struck westwards over the slopes of the Kuen Lun. Some Wakhani Kirghiz here encamped had the regular features and light eyes betokening their Aryan origin. After crossing six passes all leading westward, the party fell in with Colonel

Pevtsoff's camp, which consisted of four felt *yurts*, a bivouac where the soldiers cooked, and a workshop in the open air where some of the soldiers were making camel trunks: they had about a hundred camels, all of the Baktrian two-humped breed. The soldiers were clever workmen and good campaigners, and had already been two years with General Prejevalsky. Colonel Pevtsoff and Lieutenant Roborovzky greeted M. Dauvergne very cordially, and after inspecting approvingly his modest tent and equipment invited him to an excellent dinner *à la Russe*, washed down with wine from Samarkand and capital coffee. M. Dauvergne remarks, 'In short, here as elsewhere in Russian Turkistan, I found the greatest hospitality and kindness. It is at once seen that the Russians are our friends, and speak to us freely and without affectation, as they would to compatriots. One must have lived in India, as I have for 25 years, to have some idea of the difference in the character of these two nations.' What a difference between them and the English! Further on towards Kugiar, Major Cumberland and Lieutenant Bower (the hero of the recent journey across Tibet) were met. M. Dauvergne diverged over the mountains WSW. into the valley of the Tiznaf, where it was very hot and there were lots of fruit,—peaches and melons. Soon after he fell in with a Wakhani Kirghiz, called Sultan Beg, who spoke five languages (Hindustani, Persian, Turki, Sarikoli, and Wakhani), and proved a most useful guide. On the following day the party fell in with a native of Gilgit, who had been sold as a slave to a Turki of Karghalik by Kanjuti robbers, and wanted to be liberated by the Chinese authorities or allowed to follow M. Dauvergne's caravan, but considering the delicate position of affairs, the latter decided to leave him. 'After all,' remarks M. Dauvergne, 'he is less a slave than some workmen in France and England; he is well fed and clothed, and has only to watch sheep. I know free men who would be well content to live as he does.' The party then descended into a deep gorge, where they found themselves among the outlying spurs of the Kuen Lun, pointed rocks either red or black, and numerous iron and manganese springs. At a small square fort called Eghizarak-Kurghan copper ore is smelted in three small furnaces in a primitive way. The metal is sent to Yarkand, where the Chinese make it into *Sapèques* (coins of the value of a halfpenny, with a hole in the centre). Going up the valley the party had to climb up the steep slopes of the pass of Arpatalla-Davan to a height of 12,500 feet, and then descended into deep gorges of black rocks formed in the most fantastic shapes, such as steeples and pinnacles, requiring the pencil of a Gustave Doré to do justice to their weird and savage scenery, till suddenly turning a corner of pointed rock the travellers came upon an expanse of verdure and an orchard of apricot, apple, and wild olive trees. The village here is called Langar (meaning a junction of two rivers or two roads), and the small stream falls into the Zarafshan. The latter river had to be crossed on inflated skins, and after some trouble this was effected and the party received by Sarikoli chiefs on the other side, who inquired as to the objects of the journey, and were assured as to the peaceful intentions of the strangers. After scaling some steep rocks and some rough walking, M. Dauvergne and his companions arrived at the

junction of the Tung and the Zarafshan. The Tung valley is enclosed by lofty mountains of sharp rocks. It is rather hot here, the height not being more than 7000 feet; no snow falls in winter. The surrounding mountains are 13,000 to 15,000 feet in height. Although this valley is not far distant from the country of the Kanjutis, the inhabitants have nothing to fear from those robbers, owing to the fortress-like shape of the valley, which is accessible only by way of the Zarafshan in the east and the pass of Kotal-i-Kandhar in the west. The valley is very fertile and abounds with fruit, and the river contains fish, so the party fared well. The inhabitants appeared to be of Aryan race, with regular features; a great many are fair, with light eyes, clear complexion, and broad and powerful shoulders: there are certainly fine men among them, and though the Europeans were not allowed to see the women, it was to be presumed they were as handsome as their children. M. Dauvergne was invited to a great dinner (*dastarkwhan*), at which quantities of roast mutton and roast fowls figured largely, and out of politeness he had to eat as much as possible, but it was rather a hard task, as he and his friends had to crouch on the ground, and in the absence of forks to eat with their fingers. It is right, though, to mention that these good people did not know Western customs; it was the first time they had seen a European (*Feringhi*). M. Dauvergne was very successful as a doctor, and administered quinine and pills, but was rather embarrassed by a case of dropsy, which, however, was negociated harmlessly at all events by an ointment of vaseline and oxide of zinc.

After crossing the Kotal-i-Kandhar (16,350 feet), from which a magnificent view was obtained, a descent was made into the valley of the Sarikol Pamir up to Khurrak, a village surrounded by a circular loop-holed wall, as a precaution against the robber Kanjutis. The pass of Ogriart-Davan was crossed with the aid of camels, and descending the far side the party came to the head of the valley of Tashkurghan and in view of the fort of that name, the white walls of which could be seen on the left bank of the river Taghdumbash to the NNW. The low spurs of the Taghdumbash mountains are undulating, but overlooked by snowy peaks of a considerable height, and the blue waters of the river indicate the presence of glaciers whence they flow. Continuing their march SSE., M. Dauvergne and his party arrived at the junction of the Khunjerab and Karachunkar rivers, and ascended the latter to the ruins of a Kanjuti fort called Kurghan-i-Ghujadbai. Further on they learned that Colonel Durand and an escort of Sepoys were on a mission to the Kanjutis, and that the latter were appealing to the Chinese for help. News was also received here of Captain Grombtchevsky, who was at Ak-tash, having failed in an attempt to reach Kafiristan. M. Dauvergne kept on in a W. and WSW. direction in his quest for *Ovis Poli*, which he was anxious to shoot, and passed in succession the Mintaka and Kilik passes. After an exhausting day passed in stalking several gigantic rams in a most breakneck country, M. Dauvergne succeeded in bagging three fine heads. Here he considered his further movements, and decided to push on towards the Lesser Pamir and Wakhan and traverse the Baroghil Pass *en route* for Gilgit. A start was made in a westerly

direction towards the Wakhijrui Pass, but progress was slow owing to the newly-fallen snow. After marching for eight miles the party came opposite to two passes, one leading NW. and the other SW. The former turned out to be blocked by an impassable wall of ice. So they took the south-western, and after six miles of toilsome marching arrived at the lake of Wakhijrui on the top of the ridge (15,600 feet), with the grand peaks of the Mustagh range standing out clearly against a gray and snow-threatening sky. After a few miles of descent they came to the bed of a river which springs from three enormous glaciers and flows westward. M. Dauvergne says—'I imagined this might be the Oxus, judging by the size of its bed, and I was afterwards able to convince myself that I was right. Our camp was pitched in front of the three towering glaciers. It was a magnificent scene of its kind, desolate but imposing to the highest degree. We were at an altitude of 14,700 feet, and the neighbourhood of the glaciers made it piercingly cold. We followed the river along its right bank. On our left the great mountain chain continued to shew its snowy peaks, and its glaciers contributed numerous affluents to the main stream, the volume of which had become very considerable by the time we had followed its banks for about 15 or 16 miles.'

From here M. Dauvergne proceeded to Bosai Gumbaz, in the Khurd or Lesser Pamir, and, to make sure of his position, reconnoitred the small Gaz-Kul Lake on the top of a spur above, which forms the source of the Ak-su. The descent from these regions into the lower part of the Oxus valley is marked by milder temperature and a disappearance of the usual Pamir characteristics, which give place to rugged mountains, along which progress was difficult. At one place the whole face of the mountain seemed to have been ploughed up by gigantic waterfalls, and it was necessary to cut steps with a pickaxe in the sides of the ravines, unload and reload the ponies, till the men were fairly tired out. At Sarhad the first houses were seen. They are low and built of large stones and mud, like those in Baltistan. The Wakhani inhabitants look very miserable, and live only on the produce of their flocks and of a few fields of barley. A great number of ruins bear silent witness to Afghan oppression and the consequent desertion of the country by the inhabitants. Cultivation is neglected for want of labourers, but the country must have been flourishing in the time of Ali Mardan Shah and his father. To the south rise the snowy peaks of the Hindu Kush, and M. Dauvergne says he looked with interest towards the opening away in the direction of Dasht-i-Baroghil, which was the route he meant to take.

'As to the sources of the Oxus or Amu Darya,' remarks M. Dauvergne, 'as far as I am concerned, it is a problem solved, and it is evident that the greatest volume of its waters springs from those great glaciers of the Hindu Kush and their numerous tributaries, close to which I have camped. Some geographers assert that it rises in the Gaz-Kul, and, turning Ak-tash, becomes a considerable stream after receiving the Murghab, flowing from the Kara-Kul to the north. This is a grave error, because the Kara-Kul, which I have been round, has no outlet, and there is only the little Ak-Baital stream, which receives a small watercourse coming

from Uzbel and the Rang-Kul, which joins the Ak-su or Ak-tash, and then takes the name of Murghab, flowing westwards and joining the Oxus at Kila Wamar in Shignan.'

On the 3d October M. Dauvergne received a deputation of Wakhanis, accompanied by some villainous-looking Afghans, who begged him not to proceed until permission had been obtained from him to cross the pass, as the Amir's orders were very strict. By a stroke of diplomacy M. Dauvergne was enabled to pass on, and headed away due east, taking a line parallel to the great mountain chain and following a deep valley drained by the stream which at Mastuj becomes the Yarkhun river, and which rises in an extensive glacier on the northern slope of the ridge of Darkot. As the road led up the valley the snow became deeper, and at last the party arrived at a good-sized lake about a league in length and two kilomètres wide. Through a break in the falling snow its dark waters could be seen ruffled by a violent east wind and covered with flocks of teal and duck, doubtless on their way southwards. Here they fell in with a band of five men, armed with swords and matchlocks, driving a herd of yaks; they appeared to come from the end of the lake. They said they came from Ishkuman, where they had business with Ali Mardan Shah, their ancient chief, who was in exile, and that they were now returning to Sarhad. According to them the lake was called Ishki-Kul, and its waters flowed out towards the south, a statement which M. Dauvergne personally verified. He also found the height of the lake to be 14,030 feet. He encouraged his men by saying joyously to them, as he pointed to the stream: 'This flows to Gilgit; we have only to follow it. Come on!' But the road became worse, and finally brought them up to an enormous glacier, 160 feet in height. However, it would not do to be beaten, and after a most laborious, prolonged, and dangerous journey over three miles of glacier, where the crevasses were hidden with snow and every step was a matter of anxiety, the passage was at last made. By carefully following M. Dauvergne's tracks and beating down a path, the ponies and the baggage were brought on; but as M. Dauvergne had in the anxiety of the transit omitted to wear his blue spectacles, he paid dearly for this by severe pains of snow-blindness, which did not leave him for a week. In summer this terrible route is impassable from the swollen state of the river, and in winter from snow. Two days later the party came to a little village called Bokt, composed of three families of Wakhani refugees, who were much astonished at the arrival of the expedition, having never seen a European before. At Imit M. Dauvergne was well received by Ali Mardan Shah, brother-in-law to Nizam-ul-Mulk, son of the Mehtar of Chitral, and after passing Ishkuman, the scene of Hayward's murder, and Gakuch, finally arrived safely at Gilgit.

M. Dauvergne sums up his geographical discoveries as follows:—

1. That there is another great chain running parallel to the Kuen Lun and facing Kashgaria.

2. That the river in the Tung valley is an affluent of the Zarafshan, and not a tributary of the Taghdumbash river, as marked on Russian maps.

3. That the sources of the Oxus are at 75° E. longitude and 37° 10′ N. latitude, and not at Gaz-Kul, and take their rise in the great glaciers of the Hindu Kush, north-west of the Kilik pass.

4. That the Karambar valley is difficult but practicable, since M. Dauvergne came through it from Wakhan with a caravan of ten ponies. The waters of the Ishki-Kul give rise to the Karambar river, and not to the Yarkhun river. (From M. Dauvergne's replies to Colonel Woodthorpe, it would seem (see *Proceedings R.G.S. for* 1890, p. 96) that the lake from which the Yarkhun river flows is separated from the Ishki-Kul by a watershed.)

M. Dauvergne says he must have covered between 1500 and 1600 miles in the six months during which he was travelling, and crossed twenty-seven passes between 9000 and 17,000 feet in height, and twelve important rivers. He was contemplating a fresh exploring tour in Eastern Tibet, but, being anticipated by Captain Bower, has abandoned the project.

A SURVEY OF EXPLORATION IN BRITISH NEW GUINEA.[1]

But three years have elapsed since Her Majesty's sovereignty was proclaimed over the south-eastern section of Papua, and there is, perhaps, no other region in the Queen's dominions where science and commerce have made equal strides in this time. This will appear still more remarkable when we consider the limited resources available and the multiplicity of obstacles at all times associated with pioneering struggles in the midst of savages in an unknown region.

Her Majesty's sovereignty was proclaimed at Port Moresby on Sept. 4, 1888, and since that date the work of exploration has been conducted without interruption. The first scene of Sir William Macgregor's operations was the Louisiade and D'Entrecasteaux archipelagos, off the south-east shores of the Papuan territory. For years these islands had been the seat of feudal strife, tribal and intertribal warfare being the chief occupation of the inhabitants.

Public attention was first invited to this part of the Papuan land by the discovery of alluvial gold on Sud-Est, and subsequently on the island of St. Aignan. These goldfields are not extensive, nor have any very rich deposits as yet been discovered, but sufficient has been unearthed to keep a party of diggers employed during the past three years or so. The various islands grouped in this part of the New Guinea waters were found to be of a mountainous character, in some places bold and precipitous, in other parts rugged and broken. Most of the hills, which consist of limestone and slate, appear to have been early associated with volcanic action. On most of the larger islands traces of gold were found, and some of the creek beds and mountain faces showed strata of quartz and porphyry, and on Normanby Island this formation appeared to be associated with tin deposits. On Fergusson Island important discoveries

[1] From a paper by J. P. Thomson, F.R.S.G.S., read at the meeting of the Australian Association for the Advancement of Science, Hobart, 1892.

were made. These consisted chiefly of thermal springs, saline lakes, sulphur vents, and subterranean channels occupied by drainage water. In some of these cavities beautiful stalactitic formations were observed. The soil on most of these islands is very rich and fertile. The surface, except where it has been cleared by the natives, is clothed with forest and dense vegetation of smaller growth. The cultivated products consist chiefly of yams, *taro*, bananas, bread-fruit, sugar-cane, and sweet potatoes. It was on the island of Normanby that the Chinese banana was for the first time seen growing, as also the sweet potato. The natives beautify their dwelling-houses by the cultivation of ornamental plants. On the whole these island inhabitants are remarkably healthy. Some of the adult population suffer from the usual forms of ringworm, and yaws are not uncommon amongst the children, but the more malignant diseases, such as leprosy, phthisis, fever, ophthalmia, and elephantiasis, do not apparently claim any victims.

The garment of the men varies little in design and material from that adopted by most of the savage races inhabiting the islands of the Pacific; their everyday dress is a simple one, consisting of a girdle of *Pandanus* leaves, which is fastened to the waist of the wearer by a cord, sometimes composed of human hair. Their faces are often smeared with a dark pigment that always tends to increase the natural grotesqueness of their appearance. The women apparently endeavour to vie with their lords and masters in artistic design. Not content with pigment, they sometimes have recourse to the art of the tattooer. Their nakedness is covered by very thick grass petticoats, extending from waist to knee. Juvenile members of both sexes of the community affect the same form of dress as their elders. Their domestic animals are limited to the dingo and pig. Head-hunting, which will only be suppressed as British influence increases, obtains amongst this people, not merely in times of tribal warfare or at the instigation of feudal strife, but as a recognised occupation. The skulls are used in dwellings for ornamental purposes, where they are arranged in conspicuous places according to their order of merit; in some villages the skulls are suspended over the front parts of the houses. Tribal hostilities are common, and it is not unusual to find neighbouring villages so unfriendly with one another that the fear of being killed prevents any interchange of civilities.

To the north of these groups lie the remote islands of Trobriand, Murua, and Nada, occupying a position between the parallels of 8 deg. 25 min. to 9 deg. 23 min. south latitude, and the meridians of 150 deg. 30 min. to 153 deg. 40 min. east longitude. In Nada and the neighbouring groups to the westward are several secure harbours. While some of the islands are covered with excellent soil, admirably suited for the production of the various varieties of native food, the inhabitants of others depend for supplies on indulgent neighbours. The people are of Papuan race, active and intelligent. For arms they use the spear, shield, tomahawk, and knife, stone instruments being superseded by the more modern article from the blacksmith's forge. In dancing they are remarkably clever in the performance of graceful movements with the shield. They carve wood and devote much time to fishing.

On the north-east coast of New Guinea the boundary between British and German territory is marked by a promontory which, since the visit of the late Sir Peter Scratchley, has been known by the name of Boundary Cape, but now its old appellation, Cape Ward Hunt, has been reverted to by Sir William Macgregor in deference to the wish of the Hydrographer to Her Majesty's Government. In general aspect the north-east coast is wild, lone, and weird, the mountain ranges being steep and rugged in most places, and their flanks and leading spurs dipping into the limpid waters of the Pacific. No spacious harbours are to be found here, nor do the waters of the coastal slopes find their way to the sea by deep and wide river channels, such as those on the opposite side. Generally speaking, the coast line is formed of three great indentations, known by the names of Goodenough, Collingwood, and Dyke Acland Bay, respectively. They are of little importance to maritime enterprise as shelters to traders, cruisers, or the larger vessels of Her Majesty's Navy, for the coastal waters are full of hidden dangers to navigation. The greater part of this country is of a mountainous character, especially in the most easterly region, where mountains extend their spurs to the very water's edge, and shoot out into the long peninsula terminating in East Cape. This general aspect is, however, somewhat modified as the Anglo-German boundary is approached, where fertile valleys and open plains are at places met with. In character the vegetation of this region assumes no remarkable features, the foreshore being fringed with the usual evergreen mangroves, and the background clothed with the weird *Casuarina* and the ordinary forest trees. In some places the sago palm grows in the congenial swamps, and the majestic feathery crown of the coco-palm towers over all other forms of vegetation. Cape Nelson is chiefly noted for its numerous indentations, forming very picturesque harbours. In the neighbourhood the country is thickly inhabited by people who utilise the fringing reef for fishing purposes, and cultivate the soil profitably. It is only natural to expect that over such an extensive coast line the variations in the general characteristics of the native inhabitants should be correspondingly great. In many places, where no previous intercourse with Europeans had been held, Sir W. Macgregor found the people friendly and confident, but elsewhere shy and distrustful. Some of the men wore false whiskers from ear to ear, and their hair was dressed in great mops and matted ringlets. Their ears were embellished with rings of various shapes, and their heads were decorated with feathers, shells, and fibre. It was somewhat remarkable that in the more westerly tribes a corset of net work was worn by the women, while to the east of these the nakedness of the men was concealed by a similar garment. This coast and its inhabitants are described more fully in vol. vii. p. 162, in a note extracted from one of Mr. Thomson's lectures.

The eastern districts embrace the country between Port Moresby and East Cape; part of this territory was known before sovereignty was proclaimed, but it was not until Sir William Macgregor's official duties took him on extended tours of inspection that we were able to obtain reliable information concerning the geographical character of the whole section,

and the social conditions of the inhabitants. Of the former it may be said that the same variety exists throughout that is met with in other parts of the Possession. The basin of the Kemp-Welch comprises some fine agricultural and pastoral land, most of which, however, is occupied by the natives. Vegetation is luxuriant, the conglomerate slopes of the Astrolabe Range and its outliers are mantled by dense forest, and the lower ridges and flats are interspersed with patches of grass and timber, among which the well-known *Eucalyptus* flourishes. The limestone hills are carpeted with nutritious grass, and the intervening valleys contain soil of very rich quality. In the immediate neighbourhood of the seashore the country is thickly populated by a variety of tribal communities, but in the inland districts the people are widely scattered. The inhabitants are divided into tribes, some large and others very small, but all more or less hostile to one another, and, consequently, rarely at peace. From incessant incursions some formerly powerful tribes have been almost entirely exterminated, the remnants leading a miserable existence in tree houses. This is notably the condition of the wretched Veiburi and Seme people, who for years have been persecuted by the hostile tribes of Manukora and Garia. Not satisfied with repeated assaults upon inferior numbers of men, the Manukora savages fall also on poor defenceless women and children. Their modes of disposing of the dead are loathsome and repugnant to the civilised mind. In some places the remains are laid out on an unprotected platform where the elements are free to act on the fleshy substance. Sometimes the corses are suspended in the branches of trees in a position to allow the decomposed liquid to fall into a vessel, and others are laid out on platforms inside "dead-houses" within the villages.

One of the earliest Government stations is situated at the village of Rigo, where the interests of the Crown are protected by a resident agent. This is not far distant from the seat of Government, but the site is an eligible one and easily accessible either by land or by sea. In the district of Rigo indications of iron have been met with, and specimens of plumbago of good quality obtained. From his hurried observations Sir William Macgregor is of opinion that these plumbago deposits, which are scattered over wide areas within the district, may very probably be of considerable commercial value. The Kemp-Welch basin is walled in on its northern aspect by the Obree Mount, the highest peak of an extensive and rugged range, the slopes of which are clothed by dense vegetation. Expeditions were organised and traversed the Kemp-Welch Valley, but it was not until Mr. Cuthbertson arrived on the scene that its mysterious resources were brought to light. This explorer, who was the emissary of the Royal Geographical Society of Australasia, very pluckily succeeded in reaching an altitude of about 8000 ft., where surrounding objects were partially hidden by a dense curtain of fog. Although Mr. Cuthbertson was able to observe the peak of Mount Victoria in the Owen Stanley Range, and to obtain a good view of the surrounding range, it is still a matter of doubt with some, whether points of greater elevation in the Obree Range might not have been hidden from view by one of the numerous mist columns which so frequently obscure

the subalpine zones of the mountain. When Sir William Macgregor first visited this district, the people inhabiting its most easterly aspect were more warlike than those nearer the seat of Government. This was especially the case with the Cloudy Bay natives, who were associated with one of the most horrible tragedies ever witnessed in Papua, the massacre of Rochefort and McTier. The villages of Merani and Isimare, situated on the Domara-Wai, a small stream flowing into Cloudy Bay, were fortified by strong palisades. The soil of the locality is very rich, the cultivated products plentiful, and the vegetation most luxuriant. Overlooking this district are Mounts Suckling and Clarence. The former, some 11,000 ft. above sea level, was ascended by the Administrator, and an exploration of its neighbourhood conducted. As the result of these operations, several new birds and other objects of interest were added to science, and fresh accessions made to our hitherto limited knowledge of the geography of the region.

From a geographical standpoint the central and western divisions have yielded a more plentiful harvest, during the period over which these remarks extend, than, probably, any other part of the Possession. The extension of exploration to the culminating peaks of the Owen Stanley Range alone enriches our knowledge to a far greater extent than any previous or subsequent effort in the field of exploration. In vol. vi. p. 245 it is related how Sir W. Macgregor with a mere handful of followers ascended the Vanapa River, and after a most hazardous journey reached the summit of Mount Victoria. The views from the peaks of this mountain were most remarkable. Far away on the one hand lay the mysterious shores of the north-east coast, and on the other the dotted waters of Torres Straits, with its numerous islands and coral patches, while far away to the northward appeared the stupendous heights of Mounts Albert Edward, Scratchley, Parkes, and Gillies, so named by Sir William Macgregor. The rock specimens obtained from this alpine region pointed to its limited geological character, crystalline micaceous schist being abundantly represented. Formerly geographers had thought that the Owen Stanley Range comprised the whole unbroken mountain chain extending to the south-eastern peninsula, but the observations of this famous expedition demonstrated the existence of a break of continuity between Mounts Victoria and Obree.

One of the principal divisions of the British Possession is the St. Joseph district, bordering Hall Sound and overlooked by the highlands of the Kovio Range and Mount Yule. Watered by a fine stream, the basin of the St. Joseph River is luxuriant in vegetation, rich in soil, and opulent in cultivated products, among which *taro* flourishes in great abundance. The district has been extensively explored by Sir William Macgregor, and the conditions of the native inhabitants investigated. At the close of 1890 the Kovio Range and the summit of Mount Yule were successfully explored by the expedition of the Victorian Branch of the Royal Geographical Society of Australasia, commanded by Mr. George Belford, an officer of the New Guinea Government, under whose auspices the expedition was conducted. Formerly, it was thought that Mount Yule occupied a similar position to the Kovio Range that Mount Victoria

does to the great mountain mass bearing the name of Owen Stanley. It appears now, however, that this great physical feature must be recognised as an independent isolated mass shot upwards from the lowlands of the St. Joseph district (vol. vii. p. 445).

About the end of 1889 Sir William Macgregor commenced the ascent of the Fly River in a steam launch and two whale boats. On this occasion he was accompanied by a party of 18, including Europeans, Papuans, and other coloured men. The influence of the tide at 150 miles from the river's mouth appeared to altogether cease. After passing through low, swampy, and uninteresting country, the party reached the junction of the Fly and the Strickland Rivers; this was named after Captain Everill, who commanded the expedition sent out by the Royal Geographical Society of Australasia in 1885. Some 523 miles up the Fly long and dangerous rapids were encountered, and the river bed was occupied by sandpits and islands. In latitude 5 deg. 58 min. south, some 535 miles from the river's mouth, the limit of steam navigation was reached. From this point the journey was continued in the whale boat, which was dragged through the rapids by a rope. Two new streams were discovered and named the Palmer and the Black rivers, respectively, in honour of Sir A. H. Palmer and the Hon. M. H. Black, of Queensland. After traversing some 590 miles of the river, a splendid view of the Victor Emmanuel Range, 35 to 40 miles distant, was obtained. The general physical character of the country consisted of low forest-clad sandstone hills, ranging about 300 ft. high, the trees being similar in character to those common to the lowlands of the coastal regions. As numerous snags rendered further progress by boats impracticable without examination of the river, a fortified camp was constructed on the bank of the Palmer, some 600 miles from the mouth of the Fly River. Two Polynesians and one Papuan were placed in charge of the 600-mile camp, and the remainder of the party proceeded in the whale boat some 14 miles further up the Palmer River. From this position the Victor Emmanuel Ranges were again viewed. These ranges, which appeared to lie wholly within the German territory, are apparently excessively rugged and precipitous, part of them, at least, being inaccessible. Between these and the position of the explorers lay a range of mountains from 5000 ft. to 6000 ft. high. Part of this, which appeared to lie within the German possession, was named Mount Blücher, and the British section Mount Donaldson. The country appeared to be inhabited by a large population, less nomadic than their southern neighbours. Their large and well-cultivated gardens marked them out as an agricultural people. Commencing the return journey on the morning of the 24th January 1890, the expedition reached the mouth of the river after an absence of five weeks and four days, the distance travelled during that time being about 1200 miles. Concerning the results of this expedition, it may be stated briefly that for administrative purposes the information obtained is important. Commercially, however, the results are of less value, especially above Everill Junction. The existence of gold has been established beyond doubt, but we are not justified in believing that it would be obtainable in paying quantities.

Although thunderstorms were usual after 2 or 3 o'clock in the afternoon, there appeared to be no regular rainy season. The temperature ranged from 85 deg. to 90 deg. Fahr. during the daytime; at night, however, the thermometer fell to from 72 deg. to 76 deg. Fahr., a change that Sir William Macgregor could only account for by assuming that colder currents were wafted from the snowy mountains of Dutch New Guinea. No evidence was obtained of the existence of an interior tribe distinct from the coastal natives. The dialects of the upper and lower tribes differ completely. They are agriculturists and live in settled communities on the lower part of the river; in the middle region they are nomadic, owing to the low, swampy condition of the country and the occurrence of floods; the dwellers of the upland zone are apparently fixed cultivators of the soil. Their weapons consist of the bow and arrow. The women clothe themselves with the usual petticoats, and the bodies of the men are tattooed.

Concurrently with the Fly River exploration the Administrator extended his examination to the western country, towards the Anglo-Dutch boundary. Part of this region, within the boundary of the Kawa Kussa delta, had formerly been visited by various exploring parties, so that no remarkable new geographical features were discovered. Careful examination, however, threw some light upon formerly obscure questions concerning the geography of the numerous water channels abounding in this locality. This expedition is referred to in vol. vi. p. 552, and the natives of the Tugeri tribe are there described. To the stream entering Heath Bay the name of Morehead River was given, in honour of the Hon. B. D. Morehead, late Chief Secretary of Queensland. The country in the neighbourhood of its lower reaches is swampy and unattractive, being clothed with dense forest, mangroves, and other varieties of vegetation. Above this region the river assumes the form of continuous lagoons and swamps, so that no defined banks mark the limit of the stream. Proceeding westwards, a camp of the notorious Tugeri natives was met with, but the intention of adopting measures to prevent their annual raids eastwards was abandoned on the discovery that the camp was in Dutch territory.

Concerning the climate of British New Guinea we are not in possession of sufficient data to enable us to write with any degree of authority, nor are we able to contribute anything of special value to climatology. Generally speaking, it may be said that the Possession is healthy, no dangerous epidemics being known, and that Europeans suffer no greater inconveniences than residents of other tropical climes. In the alpine zone of the Owen Stanley Range the climate is apparently dry and bracing, and in the basin of the Upper Fly River the temperature during the night-time is invigorating and refreshing, mosquitoes and sandflies being less troublesome than in the coastal districts. In the neighbourhood of the east end of the territory several of the numerous islands enjoy salubrity of climate and freedom from the drawbacks so frequently experienced in low swampy localities. Essentially a tropical country, British New Guinea possesses a wet and a dry season, the former extending from November to the end of March, during which time heavy thunderstorms, accompanied by

drenching rain, prevail. While the dry season lasts, the south-east trade winds contribute greatly to comfort and to the salubrity of the climate.

The affairs of the territory are administered from three principal centres of organisation, Port Moresby being the geographical centre, Samarai the centre of the Eastern Division, and Mabudauan of the Western District. At each of these places a resident magistrate is stationed, with jurisdiction over a given area.

A remarkable feature of the native inhabitants of British Papua is the numerous tribal divisions and the almost correspondingly different languages or dialects spoken by them. Even in localities separated by only a few miles the dialects spoken differ one from another, in some cases considerably. The Motu, which is the language spoken and taught by the missionaries at Port Moresby, is understood over a considerable area, both east and west of that place, but outside that neighbourhood changes and variations occur, so that at the head of the great Papuan Gulf and in the Fly basin the Motu language is a foreign tongue. The same also applies to the eastern end and to the islands adjacent thereto, where the philological variations are numerous and conflicting. While in the one case the people met with in the highland zones of the Owen Stanley Range spoke a dialect akin to that of the Papuan, those encountered on the Upper Fly River expressed themselves in a tongue every word of which apparently differed from that spoken by the tribes of the lower regions, and from that spoken by any known coastal community, notwithstanding that the people themselves exhibited no evidence of distinction of race, the only marked contrast being in lightness of colour. In the western division the same diversity of speech is met with, whence neighbouring tribes are unable to hold intercourse one with the other. No doubt this may in some measure be accounted for by local environment, constant intertribal war being the means of isolating communities, so that no friendly intercourse is held, by reason of which, together with other attendant causes, a variation of language may have insensibly been established.

The Papuan fauna is of a fairly representative character; it possesses no big game, such as is met with in Africa and India, but its avifauna rivals that of any other part of the world. Of animals, those chiefly to be found in the Papuan land are the wild and domestic pigs and dogs, the tree kangaroo (*Dendrolagus dorianus*), wallabies, cuscus, cats, rats, mice (*Bita*), etc. Pigs are animals of great value to the native inhabitants. The market value of a pig is occasionally equal to that of a human being. Some of the dogs are almost, if not quite, identical with the Australian dingo, those met with on the Upper Fly River being of a bright orange colour and somewhat graceful in appearance.

Reptiles are represented by a considerable number of different species, the largest of which are those dreaded amphibious monsters of the Saurian family, the alligators, which are plentifully scattered throughout the territory in the numerous rivers, creeks, and swamps, being a constant menace to human life. The snake family is well represented, those met with, however, being chiefly common to Australia, excepting the death adder (*Acanthophis*), and the whip snake (*Diemansia*); the greater number of the

reptiles are innocuous; lizards and frogs also abound in all parts of the Possession. Insects are in swarms, from the harmless butterfly to the dreaded scorpion. Of the feathered family, Papua can probably produce a more brilliant variety than any other island of the globe. There are the noble cassowary, large and pygmy geese, ducks, fowls, pigeons, cockatoos (both black and white), parrots, kingfishers, hornbills, riflebirds, several varieties of bower-birds, the cat bird, and probably over twenty-five different species of Paradise birds.

As yet our insight into the geology of British Papua is both elementary and fragmentary. Based upon no specially geological examination, our knowledge is more superficial than practical, being derived chiefly from examination of collected specimens, which probably do not fully represent the fundamental condition of the localities from which they were obtained. Notwithstanding this, it will be freely admitted that many useful and practical data are available upon which a general sketch may be based. The first collection of specimens from the Fly River revealed the auriferous character of that part of the territory. Although the analysis was based chiefly upon some stone tomahawks of altered sandstone and greenstone or diorite, the results obtained were indicative of the existence of gold; while the conclusions we are enabled to arrive at inferentially of the probable auriferous character of the high ranges of the interior, are derived from an examination of the fragmentary specimens of slate, quartz, sandstone, greenstone, and jasperoid rocks, obtained from the coast east of Redscar Bay, and also from the material supplied by the expedition to the summit of the Owen Stanley Range, upon which occasion indications of gold were actually obtained in the bed of the Vanapa River. Basaltic lavas occur frequently, and palæozoic rocks are met with in abundance. The fossiliferous rocks noticed were those belonging to the Tertiary period. Of the specimens obtained the first were discovered at Yule Island. Others have since been found in several localities in the Possession, notably the Upper Strickland River, where marine fossils, chiefly molluscs, were discovered; the occurrence of ammonites, on the middle region of that watercourse, was also noticed. It is clear, however, that in speaking of the palæontology of Papua much care and caution is necessary, and that even the best results obtainable are only of a fragmentary character, to which too great an importance must not be attached. Of the goldfields we are in a position to summarise with some considerable degree of confidence. Although gold-bearing deposits have been obtained in several districts of the Possession, the chief, and practically the only, centre of activity is the island of Sud-Est, and in a much less degree some of the neighbouring islands, where gold in paying quantities is also procured. It is a somewhat remarkable fact that the general geological features of British Papua are in a very considerable degree identical in character with those of Australia, several specimens being similar to those of the Silurian series from goldfields in New South Wales, while some of the fossiliferous rocks were obtained from beds of clay similar to those at Geelong and Cape Otway in Victoria. From these foregoing remarks it may not be unreasonable nor unjustifiable to assume that mineral areas of great value may yet await discovery.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

At a Meeting of the Glasgow Branch of the Society, held on 29th April, Mr. H. M. Cadell read the paper on "The Yellowstone Region and its Geysers," which was published in last month's *Magazine*. The paper was illustrated by lime-light views. Dr. Jolly presided over the Meeting, and moved a vote of thanks to the lecturer.

On the 28th April a Meeting of the Society was held at Edinburgh, Dr. Geo. Smith being in the Chair. A discussion on Malaria, in relation to the settlement of tropical regions by Europeans, was introduced in a paper on the subject by Dr. H. Martyn Clark, of Amritsar (Punjab). The Rev. Dr. Laws, Mr. W. Kinnaird Rose, and General Sir Robert M. Smith took part in the discussion. On the motion of the Chairman, Dr. Martyn Clark was thanked for his paper and for having introduced so interesting a discussion.

On May 18th a Meeting was held at Edinburgh, at which Professor James Geikie read a paper on "Recent Researches in Pleistocene Geography." At the close of the lecture, Professor Copeland said a few words on the Precession of the Equinoxes as affecting climate, and then a vote of thanks was accorded to the lecturer on the motion of the Chairman, Lord M'Laren.

The London Branch of the Society held a Meeting at 20 Hanover Square on May 31st. The Chair was taken by the Duke of Argyll, President of the Society. Mrs. Bishop delivered an interesting lecture on "A Journey through Lesser Tibet," the lime-light views being explained by Mr. Faithfull Begg. The vote of thanks to Mrs. Bishop was moved by the Chairman, and seconded by Mr. Henry Wellcome. A vote of thanks to the Chairman, proposed by Dr. Harley, terminated the proceedings.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A., F.R.S.E.,

Assistant Librarian, R.S.G.S.

EUROPE.

The Mean Level of the European Seas.—The new measurements executed with Lallemand's instruments, combined with more accurate levelling operations in various countries, have proved that the theory that the levels of the European seas differ to any great extent is quite erroneous. In *Petermann's Mitt.*, Bd. 38, No. 5, a table is given of mean-levels, compiled by the Meteorological Commission of the Bouches du Rhône from observations made at 38 stations, the mean-level at Marseilles being taken at the zero point. From this it appears that the variation in the mean-level of the seas in question does not exceed a few centimètres, except in two or three cases.

La Camargue.—This large delta of 178,000 acres, contained by the Great and Little Rhone and having Arles at its apex, was formerly a desert, owing to floods and the unhealthiness of its climate, though the chemical composition of the soil is well adapted for cultivation. It is an alluvial plain formed by deposits of the Rhone and its tributaries. To protect the country from the waters of the Rhone and from

the sea, when the wind blows towards the land, dykes have been constructed, and those tracts which lie below the sea-level have been drained into the large lake of Valcarès, which occupies the lower part of the delta. Fourteen thousand eight hundred acres have already been planted with vines, and various other crops are being introduced. Pasturage for 200,000 sheep has been provided, and M. Prillieux has introduced the Australian saltbush, which yields good forage in salt lands, and is available when other vegetation is destroyed by drought. Two lines of railway are now in course of construction, and will be opened during the present year, one from Arles to Saintes-Maries, the other, on the east, from Arles to Faraman.—*Revue Française et Exploration*, April 1st.

Russian Railways.—A note by Monsieur Bellet, in the *Compte Rendu*, No. 6, of the Paris Geographical Society, shows the progress of railway construction in Russia. In 1840 a commencement was made by laying a line 17 miles long, and in 1860 only 982 miles were open to traffic. During the next ten years the development of railway communication made enormous strides, so that in 1870 the total length of line amounted to 6942 miles ; in 1880 it had reached 14,815 miles ; and 18,968 in 1888. At the present time the iron network of Russia in Europe probably exceeds 19,200 miles. It appears, however, that Russians make comparatively little use of their lines. Only 43 million passengers are carried annually, whereas 721 millions travel on the English lines, 14,300 miles in length, not including holders of tourists' tickets.

Russian Surveys.—At a meeting of the Paris Geographical Society on May 20th M. Venukoff gave a sketch of the surveys executed in Russia during the year 1891. After referring to the exploration of the Black Sea continued by MM. Spindler, Andrussof, and Wrangell, of which an account was given on page 154 of this volume, he turned to the geodetic and topographical work executed in the Crimea, which has been the means of ascertaining that the Roman Kosh (5601 feet high) is the culminating point of the mountains of the peninsula, and not the Tchatyr Dagh (5002 feet), as has hitherto been supposed. The phenomena of terrestrial magnetism and the local attractions of the mountains of the Crimea have also received attention.

Among the geodetic works produced is a large map of the triangulation between Kishineff and Astrakhan, along the parallel of 47° 30′ N. This arc extends over nineteen degrees of longitude. It is remarkable that this triangulation, though quite independent, agrees exactly with that of the 52nd parallel in regard to the anomalies observed in the length of different degrees of longitude (see vol. vii., p. 494). Between the same meridians the differences of the lengths of degrees of longitude, as measured geodetically and calculated astronomically, have always the same sign.

Observations at Bossekop.—The close connection between the Aurora and magnetism induced Herr O. Baschin to accompany Dr. Brendel to Bossekop for the purpose of observing this phenomenon. On January first of this year they entered the Alten Fiord, at the end of which lies Bossekop. It is built on the slope of one of the raised beaches so common on the shores of the fiord and in the adjacent valleys. An elevation of the shore amounting to 43 inches is said to have taken place during the last fifty years, but the calculations are not beyond suspicion. Dr. Brendel succeeded in obtaining photographs of different forms of the Aurora, the only ones at present in existence. Violent magnetic disturbances have often been observed during displays of the Northern Lights, and the close relation of these phenomena is further demonstrated by the fact that the centres

of the arcs of light lie on the magnetic meridian, and that the corona, the most splendid form of Aurora, lies in the magnetic zenith. The most remarkable disturbances took place on February 14, accompanied by an unusually gorgeous display of the Aurora, when the magnetic declination was observed to vary more than 12°—the greatest deviation ever noticed—within eight minutes. At the same time the disturbances in Europe and North America were so great that most of the self-registering instruments were unable to record them. It is not possible at present to determine with certainty the cause of these striking phenomena, but it seems probable that the great sun-spot, seventeen times as large as the surface of the Earth, which was at the time visible even to the naked eye, was connected with the disturbances mentioned.

The meteorological observations also presented much that was interesting. The temperature on the west coast of Norway does not fall nearly so low as might be expected in such high latitudes. Even at the North Cape the mean of the coldest month is only 23° F., whereas in West Greenland on the same latitude the temperature sinks every winter to −40°. As, however, the distance from the coast increases, the temperature falls rapidly. The minimum observed at Gjesvar, near the North Cape, is −2° F. ; at Bossekop, 33 miles from the open sea, −22° ; and at Karasjok, further south but 120 miles from the coast, −60°. Thus the influence of the Gulf Stream, which prevents the fiords from freezing over, does not penetrate inland. The fall of snow in winter is not very large at Bossekop, but also increases towards the interior. In very cold weather the snow does not come down in flakes, but takes the form of crystals of ice, which, having no cohesion, are blown about by every puff of wind.

The Lapps may be divided into two classes,—the very poor fishermen of the coast and the nomadic Lapps of the mountains, who often possess considerable property. Of late years a third class has sprung up, which has settled in two inland places, Karasjok and Kautokeino. At the beginning of March the Lapps gather to a great fair at Bossekop, where many thousand ptarmigan, several tons of reindeer flesh, besides butter and tongues, change hands. Herr Baschin drove to Karasjok in a reindeer sledge, a vehicle that requires a deal of management, in order to inspect the dwellings of the Lapps settled there. The village is situated on a stream of the same name, one of the headwaters of the Tana, the second largest river of Norway, and contains about 200 inhabitants—all, with few exceptions, Lapps. Their dwellings are conical tents, 13 to 16 feet in diameter, with openings at the top to let out the smoke from the fire in the centre. Many Lapps own 2000 to 3000 head of reindeer. These people are not so powerful, intelligent, and honest as the Eskimo, and give the Norwegian Government much trouble through their propensity to steal reindeer. In Karasjok Herr Baschin found Balto and Ravna, the two Lapps who accompanied Dr. Nansen on his journey across Greenland, and on his voyage home he inspected that explorer's new vessel, which is being built at Laurvig. It has a nearly semi-circular cross section, and is rigged as a three-masted schooner. It is of 250 tons register, and is constructed almost entirely of German oak. A small engine will enable it to make six knots an hour during calms.—*Verhandl. der Gesell. für Erdkunde*, Bd. xix. No. 5.

Temperature and Elevation.—Prof. E. Ebermayer, making use of observations recorded during the past ten or twelve years at stations in Bavaria situated 446 to 3726 feet above sea-level, has arrived at the following results :—(1.) The temperature of the ground falls as the elevation increases, both as regards the annual mean and the readings of the thermometer for individual months and seasons. (2.) The greatest diminution occurs between 1600 and 2600 feet. (3.) In

spring and summer the elevation has much greater influence in lowering the temperature than in winter. (4.) On the Bavarian plateau the temperature of the ground is subject to peculiar variations. The annual mean and the temperature of the winter half of the year are normal and correspond to the elevation. In the summer half, however, and particularly in August, the intensity of the solar radiation, increasing with the vertical height, exercises a much more powerful effect on the temperature of the ground on the plateau than on mountain summits at the same elevation. (5.) In the winter half-year the ground down to a depth of 3 feet is $3\frac{1}{2}^\circ$ to $4\frac{1}{2}^\circ$ F. warmer than the air. In summer the ground is two or three degrees warmer than the air as far down as 12 or 15 inches, while at the depth of 3 feet it is two to three degrees colder. (6.) The annual range diminishes with increased elevation. (7.) With the fall of temperature the chemical forces exhibit less activity, and hence the soil is less productive.—*Globus*, Bd. lxi., No. 21.

ASIA.

Asia Minor: Railways.—Last March a new section of the Ismid-Angora railway was opened to traffic. It connects the stations of Bilejik and In-Oeni, and is 30 miles in length. Its construction has presented considerable difficulties, the gradients being steep and the tunnels no fewer than 14. Beyond In-Oeni the embankments and other works are completed as far as Angora, and probably another section of 47 miles would be opened in June. Preliminary surveys have been made between Angora and Sivas with a view to the prolongation of the railway to the latter town, and engineers are this summer to reconnoitre the country between Sivas, Diarbekir, Bagdad, Bussorah and the Persian Gulf.—*Revue Française et Exploration*, May 1st.

South-Eastern Persia.—In *Petermann's Mitt.*, Bd. 38, Nos. 4 and 5, Herr A. J. Ceyp describes a journey to the frontier of Baluchistan. Passing over the route from Tehran to Kashan, he commences his account at his departure from the latter town. The country is desolate and sandy, intersected with ridges of blown sand or small rocky elevations of volcanic origin, where robbers often lurk in the ravines, ready to plunder passing caravans. Except in the settlements, situated on widely separated fertile oases, few human beings are encountered. The town of Akta, though standing in the midst of a dreary plain, has fertile fields, and at Meibud also the ground is extensively cultivated; but the people are driven to emigration by their extreme poverty, for opium is the chief crop, bringing in large returns to individual proprietors, while the ordinary food-stuffs are neglected. Near Yezd the ground becomes firm and quite level, and the mountains close in the town on both sides. This ancient town is the original home of the Parsis, and they now number 6000 out of a population of 50,000. Though religious freedom is proclaimed by the Shah, and is established in Tehran, in the provinces subjects not confessing the dominant faith are exposed to many annoyances, and the Parsis may wear clothing only of a prescribed fashion and material, and the richest merchant dares not ride on any animal but an ass. Herr Ceyp visited a crushing-mill for *henna* and several factories for calico-printing and dyeing, and weaving linen, wool, silk, and shawl materials. The goods produced are beautifully fine, rich in colour, and tasteful in design. In the neighbourhood gazelles, moufion, stags, hares and wild ducks are plentiful, and the wild ass wanders over the desert. The next important town on the route is Kerman, capital of the province of the same name. It contains 40,000 inhabitants, and has a garrison of 400 men. The government buildings, barracks, etc., are in a very dilapidated state. Above the

town rises a chain of mountains, on a spur of which stands the ruins of an extensive castle. Bam is a rich town of 6000 inhabitants, with cleanly-kept streets. The air is pure and the climate excellent, and good water is abundant. In all the gardens are seen fine palms, oranges, and lemons. On the adjoining plain rises a lofty rock crowned by a fortress 600 years old, and at its foot stand the ruins of the old town of Bam, uninhabited for the last 34 years. The friend whom Herr Ceyp accompanied, an engineer in Persian service, was commissioned to inspect these dilapidated forts, to draw up plans for their restoration or for the construction of new ones in more advantageous sites, and to take measures for the colonisation and cultivation of the desolate tract extending for sixteen days' march between Bam and Bampur, which last century was very productive, but is now exposed to the ravages of predatory bands and suffers from scarcity of water. The country between these two towns is of a very varied character. Here and there are park-like lands, where palm-groves and bushes grow luxuriantly, as at Wekilabad near Bam, a settlement founded by a former governor who constructed an irrigation canal more than 20 miles long. Again, there are stony tracts, and hills with wild ravines, clothed here and there with sycamore, tamarisk, cactus, and other trees, and for three days the path leads through forest. Between Rigan and Bampur the mountain Mazar, fully 9000 feet high, is visible in the distance, and its snow-crowned summit forms a conspicuous landmark.

Bampur, though it is the chief town of the Baluchistan district, is nothing but a collection of about a hundred straw huts, at the foot of a hill whereon a fortress stands. The climate in January was warm but quite endurable : two months later it is extremely unhealthy. The soil of the district is fruitful but uncultivated, and it was part of the duty of Herr Ceyp's companion to draw up plans for the construction of conduits to irrigate the crown lands with water from the river. Peculiar manners and customs obtain in this frontier region, and the wild mountain tribes, who show little deference to the authority of the Shah, render travelling dangerous. Riding through rocky mountains and open desert, the travellers passed through Kash to Yalk, situated in the midst of a forest of palms among rocky hills, and arrived at Mashkid on the Persian frontier, which stands on an open plain. This was the limit of the journey, and, returning to Yalk, the travellers took a more southern route to Bampur, passing over very rough country, through Suran, a miserable village in a thick grove of palms, Apta and Fura. A great part of the country traversed appears to be sandy or rocky and barren, but there are also large tracts of valuable land, which in past times have borne abundant crops, and might be restored to their former state by repairing the old irrigation channels and constructing new ones. The people, in order to be prosperous and acquire civilised habits, need to be protected from robbers and the no less oppressive exactions of the Persian tax-gatherer.

Siberia.—M. D. J. Tcherski started last year on an expedition to explore the Kolyma, Indigirka, and Yana. Of his journey from Yakutsk to Verkhnie-Kolymsk an account has been published by the Imperial Academy of Sciences in St. Petersburg, of which an abstract is given in *Petermann's Mitt.*, Bd. 38, No. 5. The route from the Aldan to Verkhnie-Kolymsk lay through a region hitherto unexplored scientifically. Towards the end of June the expedition left Yakutsk, and, travelling to the east-north-east, crossed the Aldan near the mouth of the Amga, and then penetrated by the basin of the Khandyga into the Verkhoiansk mountains. Passing over these, they descended to the Omekon, which is regarded by the natives as the parent stream of the Indigirka. The party, therefore, crossed the mountains not far from their junction with the Stanovoi range, which here runs east

and west, while the Verkhoiansk has, near the point of junction, a meridional direction. The country between the Indigirka and the Kolyma is occupied by a branch of the Stanovoi range, which falls into several subdivisions. This system was crossed by three great passes elevated above the limit of forest-growth. The mountain ridges run to the north-west or north-north-west. After passing the slopes of the last range, which forms the watershed between the Indigirka and the Kolyma, the expedition entered a plateau, and then descended to Verkhnie-Kolymsk, which is situated in the midst of a *tundra*, relieved by patches of forest. In this wretched settlement, containing only five Russian families, Herr Tcherski made arrangements to pass the winter, intending this summer to descend the Kolyma by boat. In his description of the mountain district he traversed, Herr Tcherski remarks on the absence of torrents, waterfalls, and ravines. The valleys are broad and tame, and the action of the streams tends to level the valley-bottoms by filling up the hollows with *débris*. The streams send out numerous branches, which meander over the whole breadth of the valley, and, when the water is high, present serious obstacles to the traveller. Clumps of huge poplars and fine willows grow beside the water, and the northern slopes of the valleys are sometimes covered with white reindeer moss, while the southern slopes are rocky. The rich flora on the meadow lands might make the traveller forget what high latitudes he has reached, were it not for the sheets of ice which intersect the meadows. In August the temperature also showed that the party were to the north of the 65th parallel; on fourteen days the thermometer fell below freezing point, and on six snow fell. On the southern slopes of the Verkhoiansk mountains M. Tcherski found no reliable indications of the age of the rocks: from the brown coal and fragments of fossil vegetation he inferred that they perhaps belonged to the Tertiary period. In the western part, where a synclinal fold occurs, he discovered unmistakable traces of Silurian rocks. Three days' march beyond the Omekon he met with the first indications of Triassic deposits, and beyond the central ridge Silurian limestone, which composes the water-shed between the Kolmya and the Indigirka. Lastly, along the lower course of the Syryanka, a tributary of the Kolyma, coal-bearing rocks, probably of Tertiary age, again appear. Quaternary deposits prevail in the neighbourhood of Verkhnie-Kolymsk.

Mongolia.—Last year the St. Petersburg Academy of Sciences fitted out an archæological expedition to the Orkhon River. Starting from Kiakhta, the leader, M. Radloff, began his investigations at the ruins of Khara-Balgassun, 25 miles from Ugai-Nora (Ughe-Nor?). These ruins are the remains of an old Ugrian town, and consist of traces of streets, fragments of brick, granite flags, etc. On the east lie the ruins of an immense Mongolian palace, surrounded by a mud wall strengthened by beams of timber. Meanwhile two other members of the expedition, MM. Fadrintsoff and Lewin, ascended the Tola river and to the sources of the Jermontai. On the way they discovered graves, monuments, and statues. Afterwards M. Radloff visited the ruins of Erdeni-zsu, which he considers to be the ruins of a Mongolian Karakorum of the thirteenth century. The discovery by M. Fadrintsoff of the grave of a khan, with a Turkish inscription, throws a new light on the distribution of the Turkish race in Central Asia before the Mongolian period. Large collections of botanical and geological specimens were formed, and several meteorological observations were taken.—*Deutsche Rundschau*, Jahrg. xiv., Heft 9.

Captain Bower's Journey across Tibet.—The further particulars to hand in the Indian papers regarding Captain Bower's journey over the highlands of Tibet from west to east give a good notion of the general features of this remarkable piece of

exploration. Captain Bower had gained experience in mountaineering in his shooting expeditions with Major Cumberland in the Pamirs in 1889, though his Tibetan exploit must have been of a far more trying character. The party consisted of Captain Bower, Dr. Thorold, a native sub-surveyor, a Pathan orderly from the explorer's own regiment (the 17th Bengal Cavalry), a Rajput cook, and six caravan drivers, Arguns of Ladak ; while forty-seven ponies and mules were impressed for the carriage of the baggage and provisions, a large quantity of the latter being required. Leh was left on the 14th June 1891, and Tibet entered on the 3d of July by the Lanak-la Pass, the same by which Mr. Carey travelled in 1885. Captain Bower had no guides with him, and had to steer his course by the compass, astronomical observations being frequently taken. A chain of salt lakes was passed, and for thirteen consecutive days very high altitudes had to be surmounted (17,000 feet and upwards). When these had been left behind, the course taken was east by south over rolling hills some 2000 feet lower than those previously crossed. To the north magnificent snowy ranges were seen, one prominent peak being situated in 83° E. long. and 35° N. lat. Water was scarce, while the provisions had to be eked out by the flesh of the wild horse, which was shot from time to time. After many weeks' marching the party arrived on September 3d at Gya-kiu-Liuching, on the north-eastern shores of Lake Tengri Nor. Like his predecessor, M. Bonvalot, Captain Bower and his companions were here stopped by officials from the Devi Jung or temporal ruler of Lhasa, but eventually they were allowed to proceed north-eastward, four guides and twenty ponies being provided by the local authorities. The guides, however, bolted at the first opportunity, leaving their four strong ponies behind, and, when pursued and hard pressed, took to the hills on foot. In this part of his journey Captain Bower again struck Bonvalot's route and followed it for a few miles, but soon turned off to the south-east, in order to reach (December 21st) Chiamdo, a town with 12,000 people, 3000 monks, and splendid monasteries. Two large rivers have their junction here, and the valley is very fertile and well wooded ; villages abound, and it seems the best part of Tibet. Being disappointed in the hope of being allowed to pass through Lhasa to Darjiling, Captain Bower then thought of making southward for Burma, but eventually proceeded towards Tarchendo, where he arrived on January 17th. He had travelled over 2000 miles of country, almost wholly unexplored up to that date ; of seventy-one ponies and mules fifty-two had died ; but he had neither lost a man nor fired a shot, and this without any escort such as other travellers had been furnished with. As regards the climate of the plateau, he found that light rain fell fairly often ; so the country is not rainless in summer and autumn, as generally supposed. The plateau with its rolling hills is, however, absolutely treeless, the first tree being sighted in the neighbourhood of Chiamdo, where the moisture-bearing clouds from the Pacific and China Seas first impinge on the escarpment of the Tibetan table-land. The geographical results of the journey are described as new and valuable.

Phu Kuoc.—This island, called by the Siamese Koh Tron, is situated in the eastern part of the Gulf of Siam, to the south of Cambodia and to the west of Hatien. Between the island and Hatien lie the Pirate islands, now uninhabited, and on the north-west are two other uninhabited islets. Koh Tron has the form of an isosceles triangle, with its base to the north ; beyond its southern point extends a chain of islets, rising into summits over 400 feet above the sea. The length of the island is twenty-eight miles, and its greatest breadth fifteen and a half. Numerous peaks attain considerable altitudes compared to the size of the island : the Kwala and False Kwala in the north are about 1200 feet high. The Annamese inhabitants dwell in six miserable villages, the chief of which, Ham-

Ninh and Duong-Dong, are connected by a road running across the island. To the south of this route the interior is occupied by marshes, while to the north are primeval forests, inhabited by wild boars, deer, and tigers. The vegetation is extremely luxuriant, and hence a walk across the island is delightful. At Bay-Doc are mines of coal and jet: the former is worthless, but the jet is of excellent quality, and is exported to Saigon. There is a large plantation on the island, where gambier, tobacco, pepper, coco, and areca nuts are successfully grown. Coffee has proved to be a very profitable crop in Phu Kuoc, where it thrives much better than in Cochin China.—*Bull. de la Soc. de Géogr. de Marseille*, 2^{me} Trim., 1892.

The Malay Peninsula.—Count Meyners d'Estrey has communicated to the Paris Geographical Society a few notes on the Semang and Sakei tribes, dwelling in the districts of Keda and Perak (*Compte Rendu*, No. 8). They claim to be the original inhabitants of the peninsula. Now they have been chased by the Malays from the coast into the forests of the interior. The Sakei resemble Negroes, having woolly hair, flat noses, and thick lips; whereas the Semang have a copper-coloured complexion and straight brown hair. The former occasionally have dealings with the Malays, but the Semang never leave their mountain fastnesses. These tribes live on good terms with one another, and observe the same customs, though their languages differ. Polygamy is permitted, but seldom practised: adultery is punished with death. Of religion there is no trace among them, nor have they acquired any civilised habits. Never resting more than one day in the same place, they live entirely from hand to mouth, possessing no domestic animals, and building no huts.

Sumba.—A letter from Dr. Ten Kate is published in the *Compte Rendu*, No. 7, of the Paris Geogr. Soc. Dr. Ten Kate embarked at Kupang (Timor) in April last year, and, landing at Sikka, crossed the island of Flores, after which he visited the Great Bastard and the islands of Solor and Adonara. Later in the year he sailed for Sumba, making a short stay on the way at the small island of Savu, which contains a people resembling in physiognomy the Hindus. The Sumbanese are divided into several kingdoms absolutely independent, and speak three or four distinct languages. They possess thousands of small but fiery horses: they are perpetually at war among themselves, and are addicted to barbarous customs, which cause the deaths of numerous victims. The tombs of the Sumbanese are of the dolmen type: in the ancient tombs the stones are carved with great care. Dr. Ten Kate explored the fine group of mountains in the east of the island, crossed the island from south-east to north-west, and made a tour round the coast. The geological formations are almost exclusively calcareous and marine; eruptive rocks are rarely met with, and the volcano, marked on some maps near to Tarimbang, has no existence. There is no distinct chain, but the mountains form isolated groups separated by immense plateaus. The prairies cover a large area, and forests are few. The climate is very variable, and the range of temperature considerable, the thermometer sometimes marking 54° Fahr. in the morning, and 88° at two o'clock in the afternoon. The fauna of the island is poor, especially in *Mammalia*; the only carnivorous animal is a kind of *Paradoxurus*.

Rotti.—Herr Arthur Wichmann, who has been commissioned by the Amsterdam Geographical Society to explore the Dutch East Indies, contributes an article on the island of Rotti to *Petermann's Mitt.*, Bd. 38, No. 5. The island is fifty-one miles long and nowhere more than sixteen miles broad. At the north-eastern end the large peninsula of Landu is formed by the two deep gulfs of Renggu and Korbaffo. This peninsula is to a great extent marshy and covered with a recent deposit

of marine mud. The other part of the island is traversed by a ridge of hills, surmounted by plateaus with an average height of 430 feet, but rising in the districts of Talaë and Keka, midway along the southern coast, to 1200 feet. On these plateaus stand here and there limestone peaks, which occasionally attain to a height of about 1500 above sea-level. On Landu the highlands lie at an elevation of 160 feet on an average. On the highlands exist several lakes where, according to the natives, crocodiles are found, and in Landu is a salt-water lake, the length of which is two and three-quarter miles. At some places there are springs yielding an abundant supply of water, but in general there is great scarcity during the dry season. The coasts of the island are almost everywhere begirt with reefs, which occasionally rise out of the water in rocks and islands.

The geological construction of the island is simple. It consists chiefly of Triassic rocks overlaid with more or less extensive deposits of Cainozoic age. The cliffs of coralline limestone so frequently occurring on the shore belong to the Pleistocene period. Of the Triassic fossils Rothpletz points out that three species have been found in Sicily, and two occur in the Himalayas, from which he infers that in that period an immense ocean-bed extended over Europe and the East Indies. It is remarkable that the Triassic fauna of Rotti exhibits no connection with those of New Zealand, New Caledonia, and Japan.

On the peninsula of Landu are two mud volcanoes. The larger, Bubu Sarlain, or Batu Baraketak, owes its present form to the violent eruption of February 1885. It is a mound of grey clay, fifty feet high, containing numerous fragments of stone and some fossil remains which, in part, are identical with those found in the neighbourhood of Kupang, Timor, and belong to the Permian systems: others belong to the Lias and Dogger formations. Of eruptive rocks there is no trace, and earthquakes rarely occur. The mountain slopes and elevated plateaus are covered with *Alang-Alang* grass (*Imperata arundinacea*), which serves as forage for innumerable buffaloes and horses. The fauna and flora of the island have been noticed in the *S. G. M.*, vol. vi. p. 428, where also some details are given concerning the inhabitants, their customs, dress, religion, and occupations. They seem capable of adapting themselves to civilised life, and are easily converted to Christianity. Herr Wichmann's article is accompanied by a map.

AFRICA.

The Niger: M. Monteil.—A letter has at length been received from this traveller. It was written at Kano, the capital of Haussa, and is dated January 6th. M. Monteil, accompanied by M. Badaire, proceeded from Wagadugu to the country of Libtako, passing through Bussumo, Wegu, and Pensa or Ponsa. Dori, the capital of Libtako, is a large town carrying on a considerable trade with Timbuktu, and is the chief market for salt in this part of the Niger basin. Quitting this town on June 1st, the expedition passed through Sebba, the capital of the small state of Yagha, and two small states, Torrodi and Uro-Geladzio, and arrived at Say, on the Niger. The town is comparatively large, but has not the importance usually attributed to it in Europe, communication with the coast being hampered by the difficulties of navigation on the river. M. Monteil was greatly hindered by the loss of his baggage animals, a terrible disease raging this year among the oxen, which left, he estimates, in some parts only one in a thousand. Also, in passing through the countries of Zerma, Mauri, and Kebbi, some of his property was stolen. At Sokoto commerce was at a standstill; the inhabitants of this large town were ruined by the cattle plague. Kano is a much more important place. The town, surrounded by a wall 26 feet high, is composed of large square houses of adobe,

ranged in wide, clean streets. It is visited by Arab traders from Constantine, Tunis, and Tripoli, and is the terminus for caravans coming from the Mediterranean through Zinder.—*Le Mouvement Géogr.*, No. 12.

Cameroons.—From the *Report* of the Chancellor it appears that in 1892 the number of Europeans in this colony is 166. Of the number of the natives no definite statistical data can be procured; the Dualla on the Cameroons river are estimated at 20,000; the Bakwiri in the mountains at 25,000; the Bamboko on the western slopes at 20,000. Ten Europeans fell a victim to the climate in 1891, dying of malaria and dysentery. Trade and production are improving. Palm-oil and kernels are the chief products, the export of ivory continues, large quantities of caoutchouc are collected, and ebony fetches a high price. Cocoa thrives well, and Liberian coffee has been tried successfully, and promises to be of great importance. Tobacco is not so promising, and cotton is a failure. Fine cattle, sheep, pigs, and goats are reared in the mountains. The value of the exports last year was £220,000; and of the imports, £210,000. Cameroons is well provided with waterways. The Mungo is navigable for a distance of 70 miles, the Wuri for 45 miles, and the Sannaga for 47 miles.—*Globus*, No. 19.

The Sanga.—At the end of last year, M. de Brazza ascended the Sanga on the *Courbet*, and arrived in four days at Wesso, the station established at the confluence of the Sanga and N'Goko. Thus far the river is easily navigated, and by unloading the boats it is possible to ascend the passage at Wesso. Accordingly, M. de Brazza took the *Courbet* up past Makela, in 3° 43′ N. lat.; and on January 4th, 1892, reached the foot of the rapids of Bania, 4° 0′ 30″ N. lat., where a post was established. Taking advantage of the high water, M. de Brazza passed the rapids, and moored the *Courbet* in the Ikela, opposite the villages where M. Fourneau was attacked (vol. vii. p. 666). On this river he established a post at the village of the chief Jambala, at about 5° N. lat., and then descended to the confluence to explore the Massiepa, the western and larger of the two head-waters of the Sanga. On this branch he met M. Mizon, coming from Yola, in lat. 3° 40′ N. According to the latter traveller, the river extends as far north as 6° 30.′ The account of the expedition in the *Mouvement Géogr.* is not very clear, and the latitudes given must be received with caution. It is somewhat singular that both the branches of the Sanga should trend at first southwards from their confluence, as appears from a comparison of the latitude of Bania with those of the furthest points reached by M. Fourneau.

The Climate of Banana.—A book on the meteorology of this port for the year 1890, by Dr. E. Etienne, has been published by the Government of the Congo State. Banana, as is well known, stands at the mouth of the Congo on its right bank. Its co-ordinates, according to Captain Gillis, are 6° 0′ 23″ S. lat. and 13° 30′ 40″ E. long. A peninsula of sand is bounded on the west by the sea, and on the east by a creek about 1000 yards broad. At the station of the Free State this tongue of land is barely 140 yards broad, and rises only 6 feet above the water. The neighbouring coasts are flat; and the nearest hills, about 260 feet high, are four to five miles distant, towards the north-east. Regular meteorological observations were not commenced until December 1889. The highest temperature observed was 94° Fahr., on March 2d; and the lowest 62°, on July 6th. April and July were the warmest and coldest months, respectively. The warmest five days, March 1st to 5th, coincided with the passage of the sun across the latitude of the place: the secondary maximum occurred from November 21st to the 26th. The cold season comprises the months of June, July, August, and September, the

monthly means in those months being lower than the mean for the year. This annual mean is 76°·8: the highest daily mean was 85°·1, and the lowest 68°·8, giving a range of 16°·3. The rainy seasons 1889-90 and 1890-91 had a totally different character. During the former 24·4 inches of rain were collected on fifty days, while in the latter only 15 inches fell on twenty-nine days. It is a curious fact that, during the great tornado of December 9th, 1889, more rain fell in 45 minutes than during the five months from September 1890 to February 1891. Dr. Etienne has never experienced thick fogs at Banana: in the haziest weather objects could be distinguished at a distance of two miles. The movement of the winds is remarkably uniform. At sunrise a light land breeze blows from the south-east or south: later in the morning a calm sets in, followed about eleven o'clock by a sea breeze from the south-west, which continues till about seven o'clock: a second calm then ensues, and, finally, about ten o'clock at night the wind begins to turn towards the south again.

Mauritius.—In 1890 the trade of the island amounted to about £4,900,000, being £600,000 less than in former years. This diminution was due to a bad season for sugar in 1889, and a great fall in the price of that article. Mauritius produces little else but sugar, and draws its supply of cereals and flour for the support of its 360,000 inhabitants almost exclusively from India. Rice, being the principal food, is the most important article of importation: the annual consumption is fully 6400 tons. The natives traffic also to a large extent in lentils and *dal*. The other imports comprise salt meat and fish, butter, cheese, French wines and other alcoholic liquors, oils, fruit and vegetables from Réunion, cattle and draught animals, tissues, coal, machinery, etc. The exports are sugar, rum, vanilla, and aloe fibres. Not only did the value of the sugar fall off in 1890, but the exportation of aloe fibres also decreased owing to increased supplies of sisal hemp from Florida and Yucatan. The vanilla crop also was very poor; this product is sent chiefly to France.—*Rapports Commerciaux*, No. 10, 1892.

AMERICA.

Peru.—In 1889-90 Mr. Courtenay de Kalb visited the Montaña of Peru. Entering from Brazil, he ascended all the principal Peruvian tributaries of the river Amazons, besides going to the possible limits of navigation on the Huallaga and Upper Amazons, or, as it is locally termed, the Alto Marañon. The greater part of the Montaña is contained in the Department of Loreto, of which Mayobamba is the official, and Iquitos the commercial, capital. The former town, situated in the valley of the Mayo on one of the most ancient routes across the Andes, formerly possessed considerable commercial importance owing to the energy and shrewdness of its inhabitants. It still contains a population of 8000, but the development of steam navigation during the past thirty years has drawn the trade into another direction, and the future of Mayobamba depends on the construction of railways. Iquitos, on the other hand, has risen from a small hamlet to a town of 6000 inhabitants. Its position near the mouths of the rivers which drain the eastern slopes of the Andes has made it an emporium where the products of this region are collected for transport down the Amazons. The distance to Iquitos from the head of navigation on the Napo is approximately 350 miles; from the head of navigation on the Ucayali, 700 miles; from Yurimaguas, at present the navigable limit on the Huallaga, 500 miles; and from the first cataract on the Amazons, known as the Pongo de Manseriche, 600 miles. The Ucayali is navigable for a greater distance by vessels drawing less than five feet of water, and on the Huallaga

the construction of dykes in one or two places, to contract the bed and scour out the sand bars, would extend navigation to Shapaja, 100 miles further. Communication is provided for by canoes to Tarapota in the valley of the Mayo, and thence partly by canoes and partly by mules to Mayobamba. A Peruvian engineer has surveyed a route for a mule-path, 70 miles long, from Mayobamba to Yurimaguas, which ought to be carried to completion at once, for it would add considerably to the trade of the Montaña by connecting districts possessing very different climates, and hence producing very dissimilar crops. The head of navigation on the rivers of Eastern Peru, uniformly about 750 feet above sea-level, marks the transition from the low-lying plains to the elevated valleys, ranging from 2000 to 8000 feet above the sea-level, which lie for the most part between the eastern and central cordilleras. On the lowlands the heat and excessive moisture are favourable to the growth of tropical forms only, and bread-stuffs, potatoes, vegetables, etc., have to be imported from the United States and Europe. Cattle thrive, but the expense of clearing the forest to form pasture land, and then keeping it free from rank vegetation, is too great to allow grazing to be carried on profitably. In the upland valleys very different conditions prevail. The districts of Tarapota and Mayobamba produce splendid potatoes, fruit, and corn, and the finest tobacco in Peru is grown at Tarapota. Timber for building corn-mills is abundant, and in many places suitable rock for mill-stones can be quarried. There are natural parks adapted for grazing, and the preparation of additional pasture land presents no great difficulty. This region possesses a mild spring-like climate, and is not infested by the insect pests so troublesome in the Amazons basin. In the valleys of the Upper Huallaga and the Mayo 10,000 square miles of territory, with an exceedingly fertile soil, would amply repay the labour of immigrants, were there sufficient means of communication. A railway might without difficulty be constructed from Cerro de Pasco through Huanuco to this country.

While towns have sprung up along the Amazons and the Marañon, the Ucayali remains as wild and desolate as it was fifty years ago. The reason is that the river flows through a very depressed basin, where enormous areas are flooded during the rainy season, in consequence of which malarial and bilious fevers are prevalent, and insects as troublesome as in any portion of the Amazons basin. The upper tributaries, however, are healthy. The Huallaga is suitable for European colonisation, and the Amazons, though hot, is healthy as far down as Tabatinga on the Brazilian frontier. The Alto Marañon, owing to its proximity to the mountains, has a lower temperature than the Amazons. Above the Pongo de Manseriche it is not navigable, except in a few short reaches. Were Pongo connected with Payta (a distance of about 350 miles) by rail, the Montaña would, when the Nicaragua canal is finished, be a thousand miles nearer Liverpool by this route than by way of Pará and the Amazons. This singular statement is partly explained by the fact that, while the distance from Pará to the Pongo is 2070 miles as the crow flies, it is increased by the detours of the river to 3000 miles.—*South American Journal*, May 21st.

MISCELLANEOUS.

Last summer Dr. Kihlman traversed the country between the **Mezen and the Petchora**. A narrative of his journey will be published in *Fennia*.

We have received a work, edited by Professor Michie Smith, in which the results of the **meteorological observations at Madras** during the year 1861-1890 are given in tabular form.

In the *Zeitschrift der Gesell. für Erdkunde zu Berlin*, Bd. xxvii. No. 1, Dr. E. von Drygalski has published an important article on the glaciers and inland ice of **Greenland**, illustrated by numerous views and a map of the district he visited last year.

Expedition Island, on the north-west coast of Australia, in lat. 15° 34′ S. and long. 123° 45′ E., has disappeared, and there is now a depth of nearly 8 fathoms over its site. Its area was about 13 square miles.—*Deutsche Rundschau*, Jahrg. xiv. Heft. 9.

Dr. Erich von Drygalski sailed from Copenhagen on May 1st on board the *Peru*, accompanied by Dr. H. Stade as meteorologist and Dr. E. Vanhöffen as zoologist. Umanak Fiord, in Western Greenland, is the destination of the expedition.—*Globus*, No. 19.

Professor Cyrus Thomas announces in *Science*, May 27th, that he has discovered a key to the mystery of the **Maya Codices**, and, probably, to the Central American inscriptions. The great majority of the characters are, he says, truly phonetic, though there are some conventional symbols.

In 1890 the seven **Australasian Colonies** exported 603,680,552 pounds of **wool**, valued at £24,397,419. Of this sum more than nine millions are accounted for by New South Wales, which owns over 55 out of the 105 million sheep in the Colonies.—*Deutsche Rundschau*, Jahrg. xiv. Heft. 9.

The *Revue de Géographie*, June 1892, reports the opening of a **new railway in Alsace**, from Altkirch to Ferrette, which will provide an outlet for the agricultural products of the upper valley of the Ill, and also open a new route for tourists through a charming country. The length of the line is about 14 miles.

NEW BOOKS.

The Ruin of the Soudan: Cause, Effect, and Remedy. A Résumé of Events—1883-1891. By Henry Russell, resident for twelve years on the Red Sea Littoral, assisted by William Gatty. With Maps and Illustrations. London: Sampson Low, Marston, and Co., 1892. Pp. 407. *Price* £1, 1s.

To tell the truth, the whole truth, and nothing but the truth, with regard to any subject is difficult, but with regard to the ruin of the Sudan it is all the more difficult because of the political factors involved, and the necessary ignorance of almost all writers as to the previous history of the country.

The authors of this book have done their work admirably, and if, as we believe, they have not fully stated the causes which led up to the Mahdi's rebellion, it is only because they are insufficiently acquainted with the internal administration of the country and the various conflicting elements at work. What they have stated is accurate, and we agree with the whole tenor of the volume. It is curious, however, that the influence of Zebehr Pasha upon the rise and rebellion of the Mahdi has been overlooked.

The book illustrates well the absolute ignorance of the British Government of all things geographical. Had there been an intelligent appreciation of geographical facts, both by the Intelligence Department and others we need not specify, the fall of Khartum would have been absolutely impossible. Indeed, in all pro-

bability, had one man been rigorously imprisoned at Cairo, Khartum would be in Egyptian hands at the present day. We will leave this riddle for our readers to investigate.

It is a pity that the origin of the photo-lithographs is not given. Why should the draftsman be ignored? And it is a very bad habit with regard to illustrations of African subjects that the same photographs dribble into half-a-dozen books without the slightest acknowledgment of the author. The map serves its purpose admirably, and a facsimile of a map drawn by General Gordon of his route from Suakin to Berber and Khartum is of interest, and would seem to point to the easiest way of an expedition reaching that place.

Tanganyika: eleven years in Central Africa. By Edward Coode Hore, Master Mariner. London: Edward Stanford, 1892. Pp. 306.

Mr. Hore gives us in this interesting little volume a trustworthy and comprehensive account of the establishment of the London Missionary Society's stations on Lake Tanganyika. He himself took a leading part in overcoming the initial difficulties of transport and establishment. Besides leading a large expedition and carrying the sections of a steamship to the Lake, he spent his time profitably in the organisation of communications on the Lake itself, in exploration, and in the founding of stations. Probably no man knows better than Mr. Hore the hydrography of Lake Tanganyika in its various aspects; and his large experience has enabled him to gain much information in regard to the native tribes. Both in this book, and in his papers published elsewhere, Mr. Hore has given most valuable information in these respects. He takes an unusually sensible view of the relations between Europeans and the natives of Africa under their control; and his remarks in this respect are well worth remembering. His references to Tippu Tib, too, should not be overlooked, for they testify to the best side of his character, and to his influence in Central Africa, which is not inconsiderable.

We think that Mr. Hore scarcely justifies his appellation of Lake Tanganyika as "the heart of Africa," for it resembles a lung rather than the heart. Nor is he correct in his view of the hydrography of the continent as a whole. Tanganyika does not occupy the unique geographical, or at least hydrographical, position which he claims for it. What Lake Victoria and the other source-reservoirs are to the Nile, and Nyassa to the Zambezi, is Tanganyika to the Congo, in spite of the Lukuga not maintaining its drainage functions. Indeed, there are remarkable homologous features in the great drainage-basins of Africa.

Life in Ancient Egypt and Assyria. From the French of G. Maspéro. London: Chapman and Hall, 1892. Pp. 376. *Price* 5*s.*

M. Maspéro's book is a most welcome addition to those which have done so much to popularise Egyptology in this country. It takes up a new standpoint in surveying the civilisation of Egypt and Assyria. Instead of a chronological history, we have in this volume vivid word-pictures presented to us of life in many of its various phases at the epochs when the characteristics of both nations were most highly developed. The first chapter describes the poorer quarters in the city of Thebes in the reign of Rameses II., the construction of the mud-brick houses, their inhabitants and occupation; the home life of the lower classes, the position of women, and the education and upbringing of their children are also dwelt upon.

Proceeding upwards in the social scale, we have next a sketch of the middle-class quarters of Thebes. The market, with its bazaars and shops, are fully

described, and the reader is asked to be present in imagination at so modern an episode as a mason's strike. The chapter on "Pharaoh" brings out his dual character as king and high-priest—the intermediary between Earth and Heaven—and initiates a short study of Egyptian religion and the various ceremonies connected therewith. "Life in the Castle" introduces us to all manner of country sports—fishing, hunting, fowling in the marshes, etc. Landscape-gardening seems to have been a triumph of art over nature in regard to the acclimatisation of foreign plants.

Illness and death, and the ceremonies in connection with embalming and interment, form the subjects of the succeeding chapters; and the Egyptian section of the book concludes with an account of the famous battle of Kadesh, when the Khita were defeated by Rameses and the war concluded by a treaty.

The description of life in Assyria follows the same plan as in that of Egypt. The comparisons and contrasts are extremely interesting; and the numerous drawings which illustrate the text make them very realistic to the reader. These drawings are excellent in every respect, and add greatly to the value of M. Maspéro's fascinating and instructive volume.

Travels and Discoveries in North and Central Africa. By Henry Barth, Ph.D., D.C.L. With full-page Illustrations of the original Woodcut Illustrations. London, New York, and Melbourne: Ward, Lock, and Co., 1890. Pp. 548. *Price* 2*s.*

This is one of the books of the "Minerva Library of Famous Books" edited by G. T. Bettany, M.A., B.Sc. The first volume of *Barth's Travels* was No. 16 of the series. As the book may be regarded as classic in African exploration, we welcome its appearance, more especially as it gives a lively and readable account of Timbuktu, Sokoto, and the Basins of the Niger and the Benue, which are of especial interest to British readers owing to the existence of the Niger Company and to French advance into the north-western portion of Africa.

Apart from being a pioneer in these regions, Barth was also a painstaking and trustworthy explorer, and his description of the various regions which he traversed, although set down in diary form, appear to be accurate and certainly are valuable, whilst the text is enriched by numerous wood engravings which add considerably to its interest.

Island Life; or the Phenomena and Causes of Insular Faunas and Floras, including a Revision and attempted Solution of the Problem of Geological Climates. By Alfred Russel Wallace. Second and Revised Edition. London: Macmillan and Co., 1892. Pp. xx+563. *Price* 6*s.*

Our pleasure in welcoming a new edition of this most important work is much enhanced by the fact that the veteran author has been enabled to revise the pages himself, and to bring the whole work down to date by discussions upon the latest additions to scientific knowledge, in so far, at least, as these have a bearing on his subjects. In this connection we note the frequent reference made to the important papers contributed to our *Magazine* by Dr. John Murray. So widely and so well is Mr. Wallace's work known to naturalists, that there is no necessity to enter into any detail regarding its scope; but an indication of the additions and alterations introduced into this edition may be welcome, and we, accordingly, confine our remarks to these. In the first place, then, we note that the matter dealing with the migrations of animals and plants during and since the Glacial Period and the remarks and deductions concerning that epoch, and those dealing with mild Arctic climates, have been somewhat modified, principally from the

results of Dr. Croll's researches. New facts regarding the Galapagos Islands are set forth at some length, making a substantial and satisfactory addition to the somewhat meagre information contained in the first edition, and rendering Chapter XIII. nearly as full and interesting as the others dealing with better known and more fully explored groups. The faunas and floras of the British Islands and of Borneo are set out at greater length than was formerly the case, the notices of the birds of Japan and of Madagascar have been considerably extended, and Australasia has come in for its due share of attention. It will be seen that the additions have been considerable, but the modifications of opinion resulting therefrom are strikingly few, showing, in no uncertain manner, the solid foundation for the work at first laid down by the author, and the strength of the theories built thereupon by him. Few similar volumes could remain so little changed in their main features after the lapse of a dozen years as the one before us. There is an excellent and copious index, and the maps, if small, are, perhaps, sufficient for their purpose, and very nicely tinted. In a word, we have nothing but the highest praise for this new issue.

The Chinese, their Present and Future: Medical, Political, and Social. By ROBERT COLTMAN, Jr., M.D. Illustrated with Fifteen Fine Photo-Engravings. F. A. Davis: Philadelphia and London, 1891. Pp. 212.

Dr. Coltman has resided and travelled in Northern China as a medical missionary, and since his return to the United States he has published his impressions of the country and people north of Shanghai. The result is very satisfactory, as a lively and very readable description is provided for the reader. The author is evidently a well-trained observer, and his remarks concerning the people and the political situation in China at the present day are well worth serious attention. It does not appear, however, very likely that the Chinese will be in any great haste to adopt the author's suggestions, given as follows in the last paragraph of the book:—

"Let us hope and believe that China's rulers will awaken to their duty, for patriotism's sake drop their internal jealousies, and hasten to develop all the latent industries of their country. Rouse, oh ye Mandarins! Awake, oh ye that rule! Open mines, build foundries, construct railroads, erect forts, arm and equip your soldiers, educate yourselves and your people, and your country is safe. Sleep on a little longer, import more of the deadly drug that is benumbing your energies, and when you have passed away, not your sons but an alien will rule. Take your choice—which?" The chatty style which the author has adopted conveys a considerable amount of interesting information; the illustrations are very good and the book is to be recommended.

Arménie, Kurdistan, et Mésopotamie. Par le COMTE DE CHOLET. Paris: E. Plon, Nourrit et Cie, 1892. Pp. 394.

A journey through Asia Minor in winter is attended by considerable difficulty and some danger, and, therefore, this narrative contains many stirring incidents. Landing at Haidar-Pasha—apparently in the year 1890—M. de Cholet travelled by rail as far as Lefké, and thence on horseback to Mussul on the Tigris, which river he descended on a raft to Bagdad, returning by Aleppo and Alexandretta. His experiences did not essentially differ from those of other travellers in these districts, but have furnished the material for a very readable book. The author has much to say on Turkish misgovernment, and illustrates his remarks by several stories which, though not always derived from unquestionable sources, and, indeed,

sometimes showing evidence of invention, are quite in harmony with the deplorable state of the administration. The depreciatory remarks on the American missionaries would have been better left out. Colonel Mark Bell found them doing good work in Armenia, and, at any rate, they are probably no worse than the missionaries of other sects. We suspect that the true cause of M. de Cholet's disapproval is that the Americans do not extend French influence and French commerce, for on this ground he inveighs against the presence in the country of Italian monks. The elevation of the people should be the first consideration in his eyes. There is a good map of Asia Minor and Mesopotamia attached to the book.

Mexico: Its Progress and Commercial Possibilities. By E. J. Howell, F.S.S. London: W. B. Whittingham and Co., Limited, 1892. Pp. x + 203. *Price* 5*s.*

The traces of an old and deeply interesting civilisation and the peculiar dress, customs, and daily life of the modern mixed inhabitants of Mexico are usually so attractive to the literary traveller that, when he comes to chronicle his impressions of the country, he can spare but small space for any other subjects. Mr. Howell has reversed all this, and has proved the possibility of writing an interesting and instructive work on Mexico with hardly an allusion to the Aztecs, to ruins, or to any of the other points about which we have, already, a good supply of information. He looks, on the contrary, to the present commercial position of the country, and endeavours to point out in what directions advance must be made in order to secure a prosperous future. British capital does not find its way so readily into Mexico as the author thinks it should, and he strives to show that there are plenty of opportunities for the investment of money with, at least, some security for a fair return. Capitalists must draw their own conclusions from what he has to say, but a careful perusal of his pages may be cordially recommended, albeit the matter is somewhat thin in places, and quotation is, perhaps, too largely indulged in for a work of the class to which it belongs.

There are various little notes made in passing which are of interest. For instance, few are probably aware that, besides numerous private collections of books, Mexico boasts of 20 large public libraries, with an aggregate of 250,000 volumes. In 1888 there were 10,726 primary schools, with 543,977 pupils. The free schools are no longer governed by the Church, but by the Legislature, and infant schools are being established in increasing numbers. There are also colleges for professional instruction, including schools of art, engineering, mining, law, medicine, and music, with one military and two naval colleges. These higher educational institutions are attended by 21,000 students. Altogether, learning appears to be making some headway in Mexico.

There is a fairly good map appended to this volume, but the want of an index is felt. The printing is clear, and the publishers have, on the whole, done their part of the work well.

The Mediterranean Shores of America. Southern California: Its Climatic, Physical and Meteorological Conditions. By P. C. Remondino, M.D. Fully Illustrated. F. A. Davis: Philadelphia and London, 1892. Pp. 160.

This book deals with the climatology of Southern California. The author divides the climate into six distinct classes, each having a different value to invalids in search of health, for not only is there a seaside climate, but a mountain climate with an altitude of 2500 to 9000 feet, and a desert climate from 360 feet below sea-level to 2500 above. The work is intended to be a short guide or abridged handbook in as condensed a form as possible, and as such it may be recommended. It is a pity that the illustrations are not of a superior character.

Phases of Animal Life, Past and Present. By R. Lydekker, B.A. London: Longmans, Green, and Co., 1892. Pp. 248. *Price* 6*s.*

Mr. Lydekker, whose researches in connection with the higher forms of fossil vertebrata are well known, contributed to the pages of *Knowledge* some time since a series of essays in a popular style, dealing with the various modes in which animals of different kinds, both recent and fossil, adapted themselves to similar conditions of existence. The author succeeded in placing before his readers many of the chief facts of interest in the simplest language possible; and in the present volume the essays referred to have been re-issued in an amended form and with some additional illustrations.

The author's mode of treating the subject makes the book very interesting to the class of general readers, for whom it is chiefly intended. But while *Phases of Animal Life* may be easily read with pleasure by those who possess no more than a general acquaintance with either Natural History or Palæontology, yet, as the book contains neat summaries of recent advances in our knowledge of the higher vertebrata, it will be read with profit by the professional biologist also.

Nomina Geographica. Sprach- und Sach-Erklärung von 42,000 Geographischen Namen aller Erdräume. Von Dr. J. J. Egli. Zweite vermehrte und verbesserte Auflage. Erste Lieferung. Leipzig: Fr. Brandstetter, 1892. Pp. viii. + 40.

The name of Dr. Egli, and his reputation as a ripe scholar in a specially chosen field, is not unknown to our readers. He is an honorary corresponding member of the Society, and vol. i. of the *Scottish Geographical Magazine* was graced with an article from his pen on the subject on which he is the first recognised authority in Europe—viz., the history and significance of geographical place-names. It is twenty years since Dr. Egli published the first edition of his *Nomina Geographica*; the present part begins the second edition, the result of thirty-three years' steady and persevering labour. The superiority of this edition over the first is shown, at least quantitatively, by the fact that, whereas the latter contained 17,000 articles, the new book will extend to 42,000. When completed it will consist of about twenty-four parts, and the total cost is estimated at twenty to twenty-four marks. The facts we have stated are in themselves quite sufficient to indicate the importance of the work under consideration. Almost every article bears witness to the industry, the extensive research, the learning, and the sound scientific method of the eminent Swiss scholar. "Aberdeen," "Andrews (St.)," and "Anglesey," are the principal articles of interest to our readers in the present instalment. We should be glad to learn that this useful book of reference had found an English translator.

Geography of Africa south of the Zambesi, with Notes on the Industries, Wealth, and Social Progress of the States and Peoples. By the Rev. William Parr Greswell, M.A. Oxon., F.R.C.I. With three Maps. Oxford: At the Clarendon Press, 1892. Pp. xii + 400. *Price* 7*s.* 6*d.*

Mr. Greswell's book on South Africa—which is issued under the auspices of the Royal Colonial Institute—is much more than a geography in the ordinary sense. It is a treatise—historical, geographical, ethnographical, constitutional, social, industrial, and commercial—on the whole region south of the Zambezi. It hardly needs to be said, after this enumeration, that the book is exhaustive. There is, indeed, no aspect of nature or of life in the South African Colonies with which

it does not deal, and on which it does not convey a large amount of valuable information. It is also an interesting and thoroughly readable book, from its skilful selection and arrangement of facts, from its constant reference to principles, from the intimate knowledge of the country and its history and customs which the author displays, and from the clearness of the style. Mr. Greswell is equally at home in describing the physical features of the country and in treating of its constitution, its system of local government, its educational system, its system of law, and its form of land tenure. In dealing with most of these subjects, Mr. Greswell has to take account of three distinct strata of social life—the aboriginal period, the Dutch period, and the British period,—and he discriminates with great accuracy between the characters of the different populations, and especially of the last two. He shows, for example, how the growth of the excellent educational system of the Cape Colony has been due almost entirely to Dutch intelligence and energy. A careful perusal of the book suggests that the title of "Geography" applied to such a work may mislead those whose ideas of the scope and true meaning of Geography are restricted by popular fallacies. A narrative volume of 400 pages on South Africa alone cannot be considered as a text-book for school or for college. Yet the work is at once geographical and educational in the strictest sense of both terms. It will be of the greatest possible value to all—and they are now not few—who are interested, either from philanthropic or from material motives, in the development of South Africa.

Elementary Geography of the British Colonies. By GEORGE M. DAWSON, LL.D., F.R.S., Assistant Director, Geological Survey of Canada, and ALEXANDER SUTHERLAND, M.A., Carlton College, Melbourne. With Illustrations. London: Macmillan and Co., 1892. *Price* 3*s.*

This is the latest addition to Macmillan's geographical series, and it fully maintains the high character which the series has derived from the preceding volumes by Geikie, Mill, Chisholm, and others. Like its predecessors it is a descriptive work based on science and arranged according to scientific principles, and it is all the more likely to be educative because it is extremely interesting. The fact should not be overlooked, however, that the effective use of such books implies high attainments in the teacher. The portions of the present volume for which Dr. Dawson is responsible are British North America, the West Indies, and the southern part of the South Atlantic Ocean; while Mr. Sutherland contributes those on Australasia, Africa, and the rest of the British Colonies, exclusive of India and Ceylon, which are treated in a separate volume of the series. There is sufficient harmony between the two portions of the book to make it, in effect, homogeneous. Dr. Dawson's treatment and style are the more evidently technical and didactic; Mr. Sutherland's are, if anything, the more picturesque and popular. The book is very fully and carefully illustrated with pictures of characteristic scenes.

Round the Empire. For the use of schools. By GEORGE R. PARKIN, M.A. With a Preface by the Rt. Hon. the EARL OF ROSEBERY, K.T. London: Cassell & Company, 1892. Pp. 263. Illustrated. *Price* 1*s.* 6*d.*

For a school *Reader* nothing better could be recommended to young people than this admirably-written treatise. Mr. Parkin is well known as the prophet of "Imperial Federation," but he has nowhere spoken to better effect than in this modest school-book. It cannot fail to impress the youth of our age, who—unless some unforeseen calamity occurs to bring about the disintegration of the Empire—will themselves be called upon to settle the great question of "Imperial Federation."

Mr. Parkin is accurate in his statements, picturesque in his method of treatment, and sound in his general conclusions, as far as they are given in this book.

The Earl of Rosebery contributes a short preface, which is admirable in its way.

We most cordially recommend this book for use in schools. It should have a wide circulation, not in this country alone, but also in Canada and Australasia. But in any future edition an index should be added.

About England: or, First Lessons in English Geography. By M. J. Barrington-Ward, M.A. London: George Bell and Sons, 1892. *Price* 1*s.* 4*d.*

In the arrangement of the text this book belongs to the class known as *Readers*, each chapter being headed by a list of the difficult words, divided into numbered paragraphs, and rendered attractive to young people by illustrations. The information is judiciously arranged and conveyed in an easy style. Clear and simple maps are given of river-basins, coal-fields, railways, etc.

Bartholomew's Pocket Guide to Edinburgh and Neighbourhood. With 9 Maps and Plans. John Bartholomew and Co.: The Edinburgh Geographical Institute, 1892. Pp. 87. *Price* 1*s.*

This is a model guide-book. The preliminary section contains a well-arranged digest of local information; the maps are of excellent execution and convenient size, and in their selection due regard has been paid to the relative importance which visitors are likely to attach to different localities. For the examination of the town various walks are suggested. The descriptions of these are of exceptional literary merit. They are pervaded by the *genius loci*, and will form delightful reading for many who have been familiar with Edinburgh for years. At the same time they make straight for the points upon which the stranger is likely to direct his attention. Throughout his work the author seems to have interpreted the city and neighbourhood with the eyes of the artist and historian, and he has succeeded in producing a guide-book at once picturesque and definite.

Cassell's Complete Pocket Guide to Europe. Revised and Enlarged. Planned and edited by Edmond C. Stedman. Compiled by Edward King. New York: Cassell Publishing Company, 1892. *Price* 6*s.*

As the imprint indicates, this *Pocket Guide to Europe*—compact rather than "complete"—is primarily designed for the use of Americans travelling in Europe. As is well known, such travellers usually rush over the Continent of Europe at rail way speed, and do not spend much time in examining details, being satisfied with broad general views of things, and "doing" on the average a capital a-day with the utmost ease and satisfaction. For all such, this pocket guide is well adapted. All the sights of London, for example, are compressed into little more than twenty pages. There is a very full list of hotels, restaurants, and theatres. There is a "round-trip omnibus route," and there are brief notes on the principal public buildings. Edinburgh is discussed in seven pages, and Glasgow in five. The amount of information crammed into such short space is wonderful: it is generally accurate, and it is precisely of the kind that rapid and superficial tourists are likely to require. The whole of Europe is described in a handy duodecimo volume of 505 pages, printed on "Bible" paper and bound in black calf. The maps are rather poor, and, being "folded in," will be very apt to come to grief.

The Canadian Guide-Book. The Tourist's and Sportsman's Guide to Eastern Canada and Newfoundland. By CHARLES G. D. ROBERTS. London: Wm. Heinemann, 1892. Pp. 270.

A handy and excellent guide with a somewhat misleading principal title, as the volume relates only to that comparatively small portion of the dominion east of Niagara Falls. There are plans of Montreal and Quebec, but none of the equally important city of Toronto. The special feature of this guide is its information for sportsmen. In "Quebec and New Brunswick the best salmon rivers and many of the best trout-waters are," we are told, "leased to private persons or fishing clubs." In Ontario and Nova Scotia, again, the waters are not leased, as a rule, and the fishing rights rest primarily in the hands of the riparian owners. There are close seasons for fish and game in the provinces of which this guide treats, even river trout having a close season from 15th September to 1st May in Ontario, and from 1st October to 1st January in Quebec. With regard to shooting deer stringent regulations prevail. In Ontario, three months' residence and a permit costing ten dollars are necessary, and no person may kill more than five deer. In Quebec, no person not domiciled there can fish in the lakes or rivers without a permit; and "angling by hand (with hook and line) is the only means permitted to be used for taking fish." Sportsmen in the Old World would willingly see introduced there some of the rules of the New World.

Meyers Konversations-Lexikon. Band xix. Heft 1. Vierte Auflage. Bibliographisches Institut. Leipzig und Wien: 1892. Pp. 64. *Price* 50 *Pfennig.*

The publishers of the well-known *Meyers Konversations-Lexikon* have adopted the excellent idea of bringing out an annual supplement. The booklet before us is the first part of the second annual volume supplementing the fourth edition, and is intended to give a summary of facts relating to the twelvemonth July 1891 to July 1892. The volume will be complete in sixteen parts, issued at intervals of a week. This first instalment comes down to *Australia*. The most important articles are *Africa*, *Anthropological Congress* (Dantzig 1891), *Asia*, and *Legislation for the Protection of Workmen* (*Arbeiterschutzgesetzgebung*). There is no need to enter into any detailed criticism of these sheets. The thoroughness and accuracy which we are accustomed to look for in this encyclopædia show, so far as we have examined it, no signs of falling off in the present instalment.

The Development of Africa: A Study in Applied Geography. By Arthur Silva White, F.R.S.E., Secretary to the Royal Scottish Geographical Society. Illustrated with a set of 14 maps specially designed by E. G. Ravenstein, F.R.G.S. Second Edition. London and Liverpool: George Philip & Son. 1892. Pp. vii + 307. *Price* 7*s.* 6*d.*

In this edition the matter of the original work has been revised so as to bring it up to date. The book is clearly printed, and neatly bound. The maps are identical with those in the earlier and larger edition, except *The Partition of Africa*, in which the changes introduced by recent treaties have been given effect to.

The Year-Book of Commerce for 1892. Compiled under the authority of the London Chamber of Commerce, and edited by Kenric B. Murray. London: Cassell & Co., Limited. Pp. 282.

In this, the third, issue of the *Year-Book of Commerce* we have a valuable

collection of statistics relating to commerce, condensed into the compass of a handy volume which ought to be invaluable to all interested in the development of international trade. The tables are in concise form, well classified and indexed, and reveal much information not readily accessible to the public, and only to be had by searching through many volumes of Board of Trade Returns and other Blue-Books. As far as the book goes the work is so satisfactory that we only regret that it is not more complete and uniform. Why, for instance, have we no returns of British trade with Brazil, Persia, and Siam? Surely, if these are available, no mere considerations of space should have excluded them. In some cases the returns might have been more thoroughly brought up to date; for instance, there is no abstract of the 1891 Cape Colony census, although it was available before the abstract of the Indian census here given. Such a work of reference should be consistent. Certain statistics, such as crime, accidents, and school attendance, are scarcely within the scope of the title, and might make room for more strictly commercial interests.

The Year Book of Science. Edited for 1891 by Professor T. G. Bonney, D.Sc., LL.D., F.R.S. London: Cassell and Co., Limited, 1892. Pp. xii.+473.

Under the editorship of Dr. Bonney a large staff of scientific workers has contributed abstracts of such memoirs, in each department of science, as appeared to the compilers to be of unusual interest. The editor himself remarks that the undertaking has been one of exceptional difficulty; in which most of those who have attempted any part of such a task will certainly be disposed to agree with him. The volume extends to 462 pages small octavo, and its scope is therefore so limited as to render the book practically useless to working-men of science.

The Distribution of the Produce. By James C. Smith. London: Kegan Paul and Co., 1892. Pp. 77.

It is unfortunately a common error to suppose that no special training is required to make a man competent to discuss economical questions. Mr. Smith betrays the absence of the necessary study both by stating the most ordinary commonplaces of Political Economy as though they were hitherto unknown, and by his ignorance of some of the chief economical laws. In this book he proposes to divide the net profit of any manufacture, the wages both of labour and management being first deducted, among all who co-operate in the production of the article manufactured. The risks of the employer are not even mentioned, while, on the other hand, a share of the profit is assigned to the capitalist whose risk is covered by the interest he receives. In case of an actual net loss, the employé is to bear his share of the "loss of anticipated profits." A strange notion of the author's is that his "wage co-operative system" would prevent over-production. Of the laws of demand and supply and of marginal utility he apparently knows nothing. His views imply that a man immediately after eating a good dinner is ready for another at the same price, provided only he has the money to pay for it.

Comparative View of the Executive and Legislative Departments of the Governments of the United States, France, England, and Germany. By John Wenzel. Boston, U.S.A.: D. C. Heath and Co., 1891. Pp. 22.

The component parts of the Governments mentioned are here set forth side by side in tabular form, with the regulations affecting the election of legislative bodies, the powers of ministers, etc. There seems to be no reason why this convenient method should have been confined to these four Governments.

Air and Water. By Vivian B. Lewes, F.I.C., F.C.S. London: Methuen and Co., 1892. Pp. 183. *Price* 2*s.* 6*d.*

This is a simply expressed and accurately written *résumé* of the chief chemical characteristics of air and water. From the point of view of a chemist it is satisfactory; but very incomplete from the standpoint of a physical geographer. Aitken's researches on dust in the atmosphere are not alluded to, and no reference is made even to such a well-known book as Angus Smith's *Air and Rain.*

Tours in Norway, Denmark, and Germany. The Leith, Hull, and Hamburg Packet Company.

This little book will be found useful by those who intend to proceed to the Continent by sea from Leith, in making a choice of route. In Norway outlines of various tours are given, and the routes are clearly indicated on maps.

The Hand-Book for Travellers in Spain. By the late Richard Ford. Revised and Corrected. Eighth Edition. London: John Murray, 1892. In Two Parts. *Price* 20*s.*

Ford's and O'Shea's are the two great English guide-books to Spain. This is a modernised edition of Ford's celebrated hand-book now out of print. We do not think the tourist need wish for a better guide to Spain than this work, which is accompanied by numerous well-executed maps and plans. A travelling map of the Peninsula, engraved by Stanford expressly for this hand-book, shows not merely existing railway lines, but also those in progress, which will open up the Peninsula in many desirable directions—as, for example, from Cadiz, *viâ* San Roque near Gibraltar, to Malaga. The index is rather peculiarly constructed, containing not merely page references to the places mentioned in the work, but details regarding the hotels, restaurants, clubs, conveyances, etc., at each tourist centre. In other guide-books these details are usually given in the body of the work; but the editor states that all information regarding hotels, etc., "liable to constant change," has been transferred to the index, and assures us that "this portion of the work will be corrected from time to time," an assurance which we trust does not imply that the other portion of the work will remain *in statu quo.* We cordially echo his remarks regarding the charm of a tour through Spain, which is now "as easy of access, as free from personal dangers, and in most respects as well supplied with the indispensable conveniences of civilised life as any tract of country in Europe. In historical and artistic interest Spain is second only to Italy; many of its cathedrals are worthy to be compared with the finest Gothic buildings of France or Germany; its Moorish remains are unrivalled; and it possesses a character and originality of its own, scarcely to be found elsewhere, by which all intelligent travellers have been irresistibly fascinated." We especially commend a trip to Spain in spring, during the "Holy Week" or "Fair" of Seville, for which special "Train de Plaisir" coupons are issued by the French-Spanish Railway Companies, obtainable through Messrs. Cook or Gaze. With regard to hotels in Spain, those marked with a * in this hand-book are usually conducted on the French system, and are often excellent. Provided the tourist keeps to the beaten track and avoids bye-paths, he or she need fear no personal discomfort.

NEW MAPS.

EUROPE.

EDINBURGH, Large-Scale Map of the Environs of ——, from Ordnance and Actual Surveys. Scale 1½ inches to a mile. *Edinburgh: John Bartholomew and Co. Price* 1*s.* and 2*s.*

This new map takes in the country as far as Prestonpans, Penicuik, and Queensferry. It is coloured in contours at intervals of 100 feet up to 1000 feet, and above that at every 250 feet. The printing is clear, and the colours are agreeable to the eye. Natural features, roads, railways, etc., are all laid down, and this map is therefore an admirable guide to the neighbourhood both for strangers and inhabitants.

ASIA.

PAMIR, Uebersichtskarte der —— und des Quellgebietes des Amu-Darja. Gezeichnet von Fr. Immanuel. Massstab 1 : 2,500,000.

Petermann's Geographische Mitteilungen, Jahrgang 1892, *Tafel* 8.

ROTTI, Karte der Insel ——. Von Prof. Dr. A. Wichmann. Massstab 1 : 500,000. *Petermann's Geographische Mitteilungen, Jahrgang* 1892, *Tafel* 9.

AFRICA.

BRITISCH-BETSCHUANA-LAND, Der westliche Theil von— und die Kalahari-Wüste. Nach Ortsbestimmungen und Erkundigungen entworfen von Edward Wilkinson. Massstab 1 : 750,000.

Petermann's Geographische Mitteilungen, Jahrgang 1892, *Tafel* 7.

MATABELE, MASHONA, AND MANICA LAND, Part of ——, illustrating the journey of Theodore Bent., Esq. from Shoshong to the Pungwe River. Scale 1 : 2,180,000, or one inch to 34 miles.

Proceedings of the Royal Geographical Society, May 1892.

SÜDWESTAFRIKANISCHEN SCHUTZGEBIETE, Karte der von Hauptmann und Lieutenant von François gemachten Aufnahmen in dem ——, 1890. Massstab 1 : 300,000. 2 Blätter.

Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten, Band x., *Heft* 2.

AMERICA.

ETATS-UNIS, Carte de la densité de population des ——, d'après le Recensement de 1890 (Indiens non compris) par degrés de Latitude et de Longitude de Greenwich. Échelle de 1 : 15,000,000.

Annales de Géographie, 15 *Avril* 1892.

NICARAGUA CANAL, Der ——. 1. Uebersichtskarte. 2. Westliche Abtheilung. 3. Fluss-und Seeabtheilung. 4. Die östliche und San Francisco-Abtheilung.

Deutsche Rundschau für Geographie und Statistik, Jahrgang xiv., *Heft* 9.

ATLASES.

THE FEDERATION ATLAS OF MODERN POLITICAL GEOGRAPHY. By T. Ruddiman Johnston, F.R.G.S. Containing 36 Maps and Astronomical and Physiographical Diagrams. *London: Ruddiman Johnston and Co., Limited.*

THE COLONIAL ATLAS. By the same.

The title, the "Federation" Atlas, is a good one: but it is scarcely justified in the present instance by any special feature of the work. It is a collection of maps of the ordinary kind, including the continents and the principal countries of the world. Six maps, however, are devoted to Australia and five to Canada, and these are among the freshest and clearest of the whole.

The "Colonial" Atlas contains a selection of seventeen maps from the above, relating specially to the British dependencies; but strangely enough omitting a separate map of India. The maps are for the most part executed in a rough style, but where general accuracy combined with cheapness is a desideratum, they will fill a useful place.

LONGMANS' SHILLING ATLAS FOR SOUTH AFRICA. *London: Longmans, Green, and Co.*

This atlas is intended for use in the schools of South Africa, and might be regarded as a companion to the same publishers' "School Geography for South Africa," were it not too small and too meagre for that position. There are not the same reasons for a special atlas for a particular colony that there are for a special text-book. The maps are by Mr. Edward Weller, and they are carefully drawn and well printed. There is a specially prepared index of places.

STANFORD'S HANDY ATLAS OF MODERN GEOGRAPHY. *London: Edward Stanford*, 1892.

Contains thirty coloured maps of the countries of the world, and an alphabetical list of names of places with their latitudes and longitudes. The list is very full, extending to 104 pages of three columns each. Some of the plates seem to have done duty before. In Canada there is no "Northern Territory" and no "North-East Territory." In Africa the divisions are coloured according to the present distribution of "spheres of influence," but there is no lettering to indicate the possessor. We note that North Zambezia is extended westward to long. 20° E. and the river Chobe. In Scotland, "Duns" is still "Dunse," and "Loch Fyne" is "Loch Fine." A useful feature is the indication of the submarine telegraph cables.

ENGLAND AND WALES, Popular Map of ——, showing Roads and Railways. 1*s.* in cloth case; 2*s.*, on cloth, in cloth case.

W. and A. K. Johnston: Edinburgh.

This map ought to be popular, as its name suggests. All railways and the principal roads are very clearly shown, and it is crammed with names to an extent, indeed, that somewhat interferes with the otherwise artistic appearance of the sheet, as it gives the various colours a somewhat dingy hue. Bound in a handsome cloth case, the map may also be had strongly mounted. We heartily recommend this production, which will be found a useful and handy companion for the tourist or cyclist.

BLACK'S HANDY ATLAS OF ENGLAND AND WALES. Edited by John Bartholomew, F.R.G.S., &c. *London: Adam and Charles Black*, 1892.

This handy atlas contains sixty-four maps and plans, of which ten are general maps of England and Wales, dealing with physical features, rainfall, railways, etc., forty are county maps, and fourteen are town plans. All are accurate, clearly printed, and tastefully coloured. The descriptive index, extending to 47 pages, is a valuable feature.

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Usavanga
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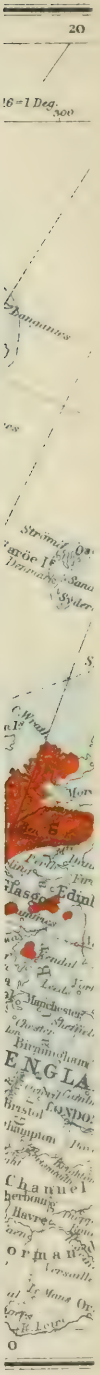
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DISTRIBUTION OF THE PYGMY TRIBES IN CENTRAL AND SOUTH AFRICA.

By Dr. Henry Schlichter.

ADAMAWA
CAMEROONS
Fernando Po
Gaboon
Libreville
Cape Lopez
Princes I.
St Thomas I.
Angobon I.
Setta Cama
Chinchoxo
Cabinda
Loango
Leopoldville
R. Congo
Salvador
S. Paulo de Loanda
LOANDA
Novo Redondo
Benguela
BENGUELA
ANGOLA
ATLANTIC
OCEAN
MOSSAMEDES
Mossamedes
Pondas
Or Fish Bay
Cunene
Walfish Bay
Sandwich Harbour
Conception B.
Hollang Bird I.
Angra Pequena
Possession I.
Pomona I.
Roast Beef I.
Orange R.
Pt Nolloth
Griquatown
Warmbad
Bethany
Hoanib
Omaruru
Otjimbingue
Tsoachaub
Hauchab
Gt Fish R.
Kuiseb
Swakop
Walvish Bay
Zandfontein
Scheppmansdorf
Tsaobis
Aris
Gamsberg
Bogenfels
Aukam
Kubub
Keetmanshoop
Bethanie
Berseba
Hoachanas
Gochas
Rehoboth
Jakalswater
Gibeon
Mariental
Maltahohe
Helmeringhausen
Bersaba
Kalkfontein
Shoshong
Palapye Road
Serowe
Mahalapye
Kanye
Molepolole
Gaberones
Mochudi
Pilane
Kolobeng
Tati
Francistown
Tuli
Shashi R.
Tati R.
Limpopo R.
Sabi R.
Lake Ngami
Lake Liambezi
Lake Dilolo
Lake Leopold II
Lake Mantumbi
Lake Bangweolo
Lake Mweru
Lake Tanganyika
Lake Kivu
Lake Albert Edward
Lake Albert
Lake Rudolf
Lake Stefanie
Lake Baringo
Lake Naivasha
Lake Victoria
Lake Nyanza
Lake Kioga
Lake Bisina
Lake Salisbury
Lake Kyoga
Lake Kwania
Lake Kioga
Lake Edward
Lake Tanganyika
Lake Nyasa
Lake Shirwa
Lake Chiuta
Lake Amaramba
Lake Ngami
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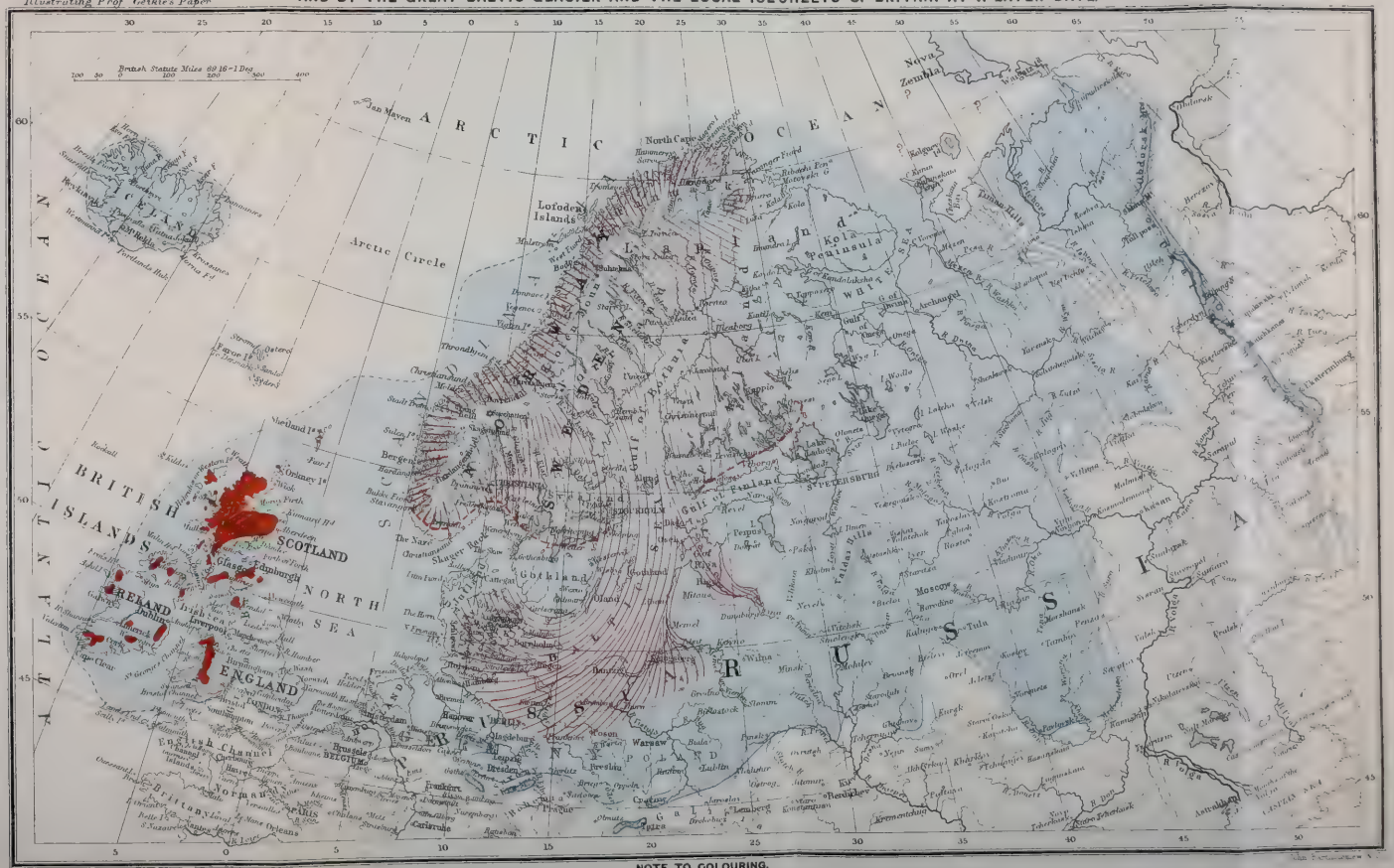
BANGALA
BANGALA

Illustrating Prof. Geikie's Paper

SKETCH MAP OF NORTHERN EUROPE

SHOWING AREAS COVERED BY ICE DURING THE EPOCH OF MAXIMUM GLACIATION, AND BY THE GREAT BALTIC GLACIER AND THE LOCAL ICE-SHEETS OF BRITAIN AT A LATER DATE.

Illustrating Prof. Geikie's Paper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Arctic Circle
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North Cape
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LAPLAND
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NORWAY
FINLAND
RUSSIA
BRITISH ISLANDS
SCOTLAND
IRELAND
ENGLAND
NORTH SEA
ATLANTIC OCEAN
Gothland
Oland
Moscow
Warsaw
Petersburg
Stockholm
Christiania
Copenhagen
Hamburg
Berlin
Dresden
Frankfurt
Brussels
BELGIUM
Amsterdam
Rotterdam
English Channel
Edinburgh
Glasgow
Liverpool
Dublin
Belfast
Aberdeen
Dundee
Newcastle
Hull
Yarmouth
Norwich
Cambridge
Oxford
London
Portsmouth
Plymouth
Brighton
Southampton
Bristol
Cardiff
Holyhead
Shetland Is.
Orkney Is.
Faroe Is.
Skagerrak
Kattegat
Baltic Sea
Gulf of Finland
Gulf of Riga
Lake Ladoga
Lake Onega
Lake Peipus
Lake Ilmen
Lake Wetter
Lake Wener
Lake Mälar
Lake Vetter
Lake Peipus
Lake Saima
Lake Enara
Lake Peipus
Lake Ilmen
Lake Onega
Lake Ladoga

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE MIGRATIONS OF THE RACES OF MEN CONSIDERED HISTORICALLY.

By Professor James Bryce, D.C.L.

(*Read at the Inaugural Meeting of the London Branch of the Society, April* 1892.)

There are two senses in which we may claim for geography that it is a meeting-point of the sciences. All the departments of research which deal with external Nature touch one another in and through it—geology, botany, zoology, meteorology, as well as, though less directly, the various branches of physics. There is no one of these whose data are not, to a greater or less extent, also within the province of geography; none whose conclusions have not a material bearing on geographical problems. And geography is also the point of contact between the sciences of Nature, taken all together, and the branches of inquiry which deal with man and his institutions. Geography gathers up the results which the geologist, the botanist, the zoologist, and the meteorologist have obtained, and presents them to the student of history, of economics, of politics—we might, perhaps, add of law, of philology, and of architecture—as an important part of the data from which he must start, and of the materials to which he will have to refer at many points in the progress of his researches. It is with this second point of contact, this aspect of geography as the basis for history, that we are to occupy ourselves to-night. Understanding that the Scottish Geographical Society desires not merely to present a current history of discovery, but to bring into prominence the economic, social, and political aspects of the science, and to inculcate its significance for those who devote themselves to the presently urgent problems which civilised man is called to deal with, I have chosen, as not unsuitable to an inaugural address, a subject which

belongs almost equally to physical and descriptive geography on the one side, to history and economics on the other. The movements of the races and tribes of mankind over the surface of our planet are in the first instance determined mainly by the physical conditions of its surface and its atmosphere; but they become themselves a part, and indeed a great part, of history: they create nations and build up states; they determine the extension of languages and laws; they bring wealth to some regions and leave others neglected; they mark out the routes of commerce, and affect the economic relations of different countries.

No line of historical inquiry sets before us more clearly at every stage the connection between man as an associative being—toiling, trading, warring, ruling, legislating—and that physical environment whose influence over his development is none the less potent and constant because he has learnt in obeying it to rule it and to make it yield to him constantly increasing benefits. The topic is so large, and branches off into so many other cognate inquiries, that you will not expect me, within the narrow limits of an address, to do more than draw its outlines, enumerate the principal causes whose action it sets before us, touch upon the successive epochs which its history presents, and refer to a few out of the many problems its consideration raises. The migrations of peoples have been among the most potent factors in making the world of to-day different from the world of thirty centuries ago. If they continue, they will be scarcely less potent in their influence on the future of the race; if they pass into new phases, those phases will be the expression of new conditions of society; if they cease, that cessation will itself be a fact of the highest economic and social significance.

At the outset it is convenient to distinguish the different forms which movements of population have taken. These forms may be grouped under three heads, which I propose to call by the names of Transference, Dispersion, and Permeation—names which need a few words of illustration.

By Transference I mean that form of migration in which the whole, or a large majority, of a race or tribe quits its ancient seats in a body and moves into some other region. Such migrations seldom occur except in the case of nomad peoples who are little attached to any particular piece of soil; but we may almost class among the nomads tribes who, like our own remote Teutonic ancestors, although they cultivate the soil, put no capital into it in the way of permanent improvements, and build no dwellings of brick or stone. The prehistoric migrations usually belonged to this form, and so did that great series of movements which brought the northern races into the Roman Empire in the fifth and sixth centuries of our era. In modern times we find few instances of Transference, because such nomad races as remain are now shut up within narrow limits by the settled States that surround them, which have possessed, since the invention of gunpowder and of standing armies, enormously superior defensive strength.[1] We should, however, have had an

[1] In 1771 a great Kalmuk horde moved *en masse* from the steppes of the Caspian to the frontiers of China, losing more than half its numbers on the way.

interesting case to point to had the Dutch, when pressed by the power of Philip II., embraced the offer that came to them from England to migrate in a body and establish themselves, their dairying, their flax culture, and their linen manufacture, in the rich pastures and humid air of Ireland.

Under the head of migrations by Dispersion I include those cases in which a tribe or race, while retaining its ancient seats, overflows into new lands, whether vacant or already occupied; in the latter event sometimes ejecting the original inhabitants, sometimes fusing with them, sometimes dwelling among them, but remaining distinct.

Examples are furnished by the case of the Norsemen, who found Iceland practically vacant, while in England they became easily, in Ireland and Gaul more slowly, mingled with the previous inhabitants. When our own ancestors came from the Frisian coast they slew or drove out the bulk of the Celtic population of Eastern Britain; when the Franks entered Gaul they became commingled with it. It is by such a process of dispersion that the British race has spread itself out over North America and Australasia. In much smaller numbers the Spaniards diffused themselves over southern North America, and the northern and western parts of South America; and by a similar process the Russians have for two centuries been very slowly filling the better parts of Siberia. Whether in any case of dispersion the migrating population becomes fused with that which it finds, depends chiefly on the difference between the level of civilisation of the two races. Between the English settlers in North America and the native Indians there has been hardly any mixture of blood; between the French in Canada and the Indians there was a little more; between the Spaniards and the less barbarous inhabitants of Mexico there has been so much that the present Mexican nation is a mixed one, the native blood doubtless predominating. Something, however, also depends on the relative numbers of the two races; and sometimes religion keeps a dispersed people from commingling with those among whom it dwells, as has happened in the case of the Jews, the Armenians, and the Parsis. These last are a remarkable instance of an extremely small nation—for there are not 80,000 of them all told—who, without any political organisation, have, by virtue of their religion, preserved their identity for more than a thousand years. Dispersion has been the most widely operative form of migration in modern times, owing to those improvements in navigation which have enabled remote parts of our large world, separated by broad and stormy seas, to be colonised more easily than in the tiny world of ancient or mediæval times was possible either by land or by sea.

The third form, which we may call Permeation or Assimilation, is not in strictness a form of migration at all, because it may exist where the number of persons changing their dwelling-place is extremely small; but it deserves to be reckoned with the other two forms because it produces effects closely resembling theirs in altering the character of a population. I use the term Permeation to cover those instances, both numerous and important, in which one race or nation so spreads over another race or nation its language, its literature, its religion, its institutions, its customs, or some one or more of these sources of influence, as

to impart its own character to the nation so influenced, and thus to substitute its own for the original type. In such a process the infusion of new blood from the stronger people to the weaker may be comparatively slight, yet, if sufficient time be allowed, the process may end by a virtual identification of the two. Of course, when there is much intermarriage, not only does the change proceed faster, but it tells on the permeating as well as on the permeated race. The earliest recorded instance of this diffusion of a civilisation with little immixture of blood is to be found in the action of the Greek language, ideas, and manners upon the countries round the eastern half of the Mediterranean, and particularly upon Asia Minor. The native languages to some extent held their ground for a while in the wilder parts of the interior, but the upper classes and the whole type of culture became everywhere Hellenic. In the same way the Romans Romanised Gaul and Spain and the more fertile regions of North Africa. In the same way the Arabs in the centuries immediately after Mohammed Arabised not only Egypt and Syria, but the whole of North Africa, down to and including the maritime parts of Morocco, and have, in later times, though to a far smaller extent, established the influence of their language and religion on the coasts of East Africa and in parts of the East Indian Archipelago. There is reason to believe, though our data are scanty, that in a somewhat similar way the Aryan tribes, who entered India at a very remote time, diffused their language, religion, and customs over Northern Hindustan as far as the Bay of Bengal, changing to some extent the dark races whom they found in possession of the country, but being also so commingled with those more numerous races as to lose much of their own character. Hinduism and languages derived from Sanskrit came to prevail from the Indus to the Brahmaputra, although it would seem that to the east of the Jumna the proportion of Aryan intruders was very small. We ourselves in India are giving to the educated and wealthier class so much that is English in the way of ideas and literature, that if the process continues for another century, our tongue may have become the *lingua franca* of India, and our type of civilisation have extinguished all others. Yet if this happens it will happen with no mixture of blood between the European and the native races, possibly with little social intimacy between them. The instances just mentioned show in what different ways and varying degrees assimilation may take place. In some of them the assimilated race still retains a distinct national character. The Moor of Morocco, for instance, differs from the Arab much as the Greek-speaking Syrian and the Latin-speaking Lusitanian differed from a Greek of Attica or a Roman of Latium. But the Finnish tribes of Northern and Eastern Russia, Voguls, Tcheremisses, Tchuvasses, and Mordvins, who have been gradually Russified during the last two centuries, are on their way to become practically undistinguishable from the true Slavonic Russians of Kieff. And to come nearer home, the Celts of Cornwall have been Anglicised, and those of the Highlands of Scotland have in many districts become assimilated to the Lowland Scotch, with no great intermixture of blood.

It is worth while to be exact in distinguishing this process of Permea-

tion from cases of Dispersion, because the two often go together—that is to say, the migration of a certain, though perhaps a small, number of persons of a vigorous and masterful race into a territory inhabited by another race of less force, or perhaps on a lower level of culture, is apt to be followed by a predominance of the stronger type, or at any rate by such a change in the character of the whole population as leads men in later times to assume that the number of migrating persons must have been large. The cases of the Greeks in Western Asia and the Spaniards in the New World are in point. We talk of Asia Minor as if it had become a Greek country under Alexander's successors, of Mexico and Peru as Spanish countries after the sixteenth century, yet in both instances the native population must have largely preponderated. If therefore we were to look only at the changes which the speech, the customs, the ideas and institutions of nations have undergone, we might be disposed to attribute too much to the mere movement of races, too little to the influences which force of character, fertility of intellect, and command of scientific resource have exercised, and are still exercising, as the leading races become more and more the owners and rulers of the backward regions of the world.

II. We may now proceed to inquire what have been the main causes to which an outflow or an overflow of population from one region to another is due. Omitting, for the present, the cases of small colonies founded for special purposes, these causes may be reduced to three. They are Food, War, and Labour. These three correspond in a sort of rough way to three stages in the progress of mankind, the first belonging especially to his savage and semi-civilised conditions, the second to that in which he organises himself in political communities, and uses his organisation to prey upon or reduce to servitude his weaker neighbours; the third to that wherein industry and commerce have become the ruling factors in his society and wealth the main object of his efforts. The correspondence, however, is far from exact, because the need of subsistence remains through the combative and the industrial periods a potent cause of migration, while the love of war and plunder, active even among savages, is by no means extinct in the mature civilisation of to-day.

In speaking of food, or rather the want of food, as a cause, we must include several sets of cases. One is that in which sheer hunger, due perhaps to a drought or a hard winter, drives a tribe to move to some new region where the beasts of chase are more numerous, or the pastures are not exhausted, or a more copious rainfall favours agriculture.[1] Another is that of a tribe increasing so fast that the pre-existing means of subsistence no longer suffice for its wants. And a third is that where, whether or not famine be present to spur its action, a people conceives the desire for life in a richer soil or a more genial climate. To one or other of these cases we may refer nearly all the movements of populations in primitive times, the best known of which are those which brought the Teutonic and

[1] A succession of dry seasons, which may merely diminish the harvest of those who inhabit tolerably humid regions, will produce such a famine in the inner parts of a continent like Asia as to force the people to seek some better dwelling-place.

Slavonic tribes into the Roman Empire. They had a hard life in northern and eastern Europe; their natural growth exceeded the resources which their pastoral or village area supplied, and when once one or two had begun to press upon their neighbours, the disturbance was felt by each in succession until some, pushed up against the very gates of the Empire, found those gates undefended, entered the tempting countries that lay towards the Mediterranean and the Ocean, and drew others on to follow. Of modern instances the most remarkable is the stream of emigration which began to swell out of Ireland after the great famine of 1846-7, and which has not yet ceased to flow.

Among civilised peoples the same force is felt in a slightly different form. As population increases the competition for the means of livelihood becomes more intense, while at the same time the standard of comfort tends to rise. Hence those on whom the pressure falls heaviest (if they are not too shiftless to move), and those who have the keenest wish to better their condition, forsake their homes for lands that lie under another sun. It is thus that the Russian peasantry have been steadily moving from the north to the south of European Russia, till they have now occupied the soil down to the very foot of the Caucasus for some 500 miles from the point they had reached a century and a half ago. It is thus that, on a smaller scale, the Greek-speaking population of the West Coast of Asia Minor is creeping eastward up the river valleys, and beginning to re-colonise the interior of that once prosperous region. It is thus that North America and Australasia have been filled by the overflow of Europe during the last sixty years, for before that time the growth of the United States and of Canada had been mainly a home growth from the small seeds planted 200 years earlier. That the mere spirit of enterprise, apart from the increase of population, counts for little as a cause of migration, seems to be shown not only by the slight outflow from Europe during last century, but by the fact that France, where the population is practically stationary, sends out no emigrants save a few to Algeria, while the steady movement from Norway and Sweden does little more than relieve the natural growth of the population of those countries. As regards European emigration to America, it is worth noting that during the last thirty years it has been steadily extending, not only eastwards towards the inland parts of Europe, but also downwards in the scale of civilisation, tapping, so to speak, lower and lower strata. Between 1840 and 1850 the flow towards America was chiefly from the British Isles. From 1849 onwards, it began to be considerable from Germany also, and very shortly afterwards from Scandinavia, reaching a figure of hundreds of thousands from the European continent in each year. From Germany the migratory tendency spread into Bohemia, Moravia, Poland, and the other Slavonic regions of the Austro-Hungarian monarchy, as well as into Italy. To-day the people of the United States, who had welcomed industrious Germans and hardy Scandinavians because both made good citizens, become daily more restive under the ignorant and semi-civilised masses whom Central Europe flings upon their shores. At the other end of the world, the vast emigration from China is partly attributable to the need of food; but to this I shall recur presently when we come to speak of Labour.

The second of our causes is War. In early times, or among the ruder peoples, it is rather to be called plunder, for most of their wars were undertaken less for permanent conquest than for booty. The invasions of Britain by the English, of Gaul by the Franks, of England and Scotland by the Norsemen and Danes, all began with mere piratical or raiding expeditions, though ending in considerable transfers of population. The same may be said of the conquest of Pegu and Arakan by the Burmese in last century, and (to a smaller extent) of that southward movement of the wild Chin and Kachin tribes whom our present rulers of Burmah find so troublesome. It was in war raids that the movement of the Bantu races to the southernmost parts of South Africa, where they have so largely displaced the yellowish Hottentot race, seems to have begun. So the conquests of Egypt and Persia by the first successors of the Prophet, so the conquests of Mexico and Peru by the Spaniards, though tinged with religious propagandism, were primarily expeditions in search of plunder. This character, indeed, belongs all through to the Spanish migrations to the New World. Apparently few people went from Spain, meaning, like our colonists a century later, to make a living by their own labour from the soil or from commerce, which, indeed, the climate of Central and South America would have rendered a more difficult task. They went to enrich themselves by robbing the natives or by getting the precious metals from the toil of natives in the mines, a form of commercial enterprise whose methods made it scarcely distinguishable from rapine. In modern times the discovery of the precious metals has helped to swell the stream of immigration, as when gold was discovered in California in 1846 and in Australia a little later; but in these instances, though enrichment is the object, rapine is no longer the means. There are, however, other senses in which we may call war a source of movements of races. It was military policy which planted the Saxons in Transylvania and the French in Lower Canada, and the Scotch and English settlers in the lower and more fertile parts of Ulster; it is military policy which has settled Russian colonies, sometimes armed, sometimes of agricultural Dissenters, along the Transcaucasian frontiers and on the further shore of the Caspian. It was military policy which led Shalmaneser and Nebuchadnezzar to carry off large parts of the people of Israel and Judah to settle them in the cities of the Medes or by the waters of Babylon.[1]

As regards the more regular conquests made by civilised States in modern times, such as those of Finland, Poland, Transcaucasia, and Transcaspia by Russia, of Bosnia and Herzegovina by Austria, of India and Cape Colony by Great Britain, of Cochin China and Annam by France, it may be said that they seldom result in any considerable transfer of population. Such effects as they have are rather due to that process of Permeation which we have already considered.

Labour (*i.e.* the need for labour) becomes a potent cause of migra-

[1] So the Siamese, after their conquest of Tenasserim, carried off many of the Talain population and settled them near Bangkok, where they remain as a distinct population to this day.

tions in this way—that the necessity for having in particular parts of the world men who can undertake a given kind of toil under given climatic conditions draws such men to those countries from their previous dwelling-place. This set of cases differs from the cases of migrations in search of subsistence, because the migrating population may have been tolerably well off at home. As the food migrations have been described as an outflow from countries overstocked with inhabitants, so in these cases of labour migration what we remark is the inflow of masses of men to fill a vacuum—that is, to supply the absence in the country to which they move of the sort of workpeople it requires. However, it often happens that the two phenomena coincide, the vacuum in one country helping to determine the direction of the influx from those other countries whose population is already superabundant. This has happened in the case of the most remarkable of such recent overflows, that of the Chinese over the coasts and islands of the Pacific. The need of Western America for cheap labour to make railways and to cultivate large areas just brought under tillage, as well as to supply domestic service, drew the Chinese to California and Oregon, and but for the stringent prohibitions of recent legislation would have brought many thousands of them into the Mississippi valley. Similar conditions were drawing them in great numbers to Australia, and especially to North Queensland, whose climate is too hot for whites to work in the fields ; but here, also, the influx has been stopped by law. Ten or twelve years ago they were beginning to form so considerable a proportion of the population of the Hawaiian isles that public opinion there compelled the sugar planters to cease importing them, and, in order to balance them, Portuguese labour was brought from the Azores, and Japanese from Japan. Into Siam and the Malay peninsula, and over the Eastern Archipelago, Chinese migration goes on steadily ; and it seems not improbable that in time this element may be the prevailing one in the whole of Indo-China and the adjoining islands, for the Chinese are not only a more prolific but altogether a stronger and hardier stock than either their relatives the Shans, Burmese, and Annamese, or their less immediate neighbours the Malays. If in the distant future there comes to be a time in which, the weaker races having been trodden down or absorbed by the more vigorous, few are left to strive for the mastery of the world, the Chinese will be one of those few. None has a greater tenacity of life.

Not unlike these Chinese migrations, but on a smaller scale, is that of Santhals to Assam, and of South Indian coolies to Ceylon (where the native population was comparatively indolent), and latterly to the isles and coasts of the Caribbean Sea. Here there has been a deliberate importation of labourers by those who needed their labour; and, although the labourers have intended to return home after a few years' service, and are indeed, under British regulations, supplied with return passage tickets, permanent settlements are likely to result, for the planters of Guiana, for instance, have little prospect of supplying themselves in any other way with the means of working their estates. The coolies would doubtless be brought to tropical Australia also, but for the dislike of the colonists to the regulations insisted on by the Indian Government: so

instead of them we see that importation of Pacific islanders into North Queensland which is now a matter of so much controversy. Under very different conditions we find the more spontaneous immigration of French Canadians into the northern United States, where they obtain employment in the factories, and are now becoming permanently resident. At first they came only to work till they had earned something wherewith to live better at home; but it constantly happens that such temporary migration is the prelude to permanent occupation. So the Irish reapers used to come to England and Scotland before the emigration from Ireland to the English and Scottish towns swelled to great proportions in 1847. The Italians who now go to the Argentine Republic less frequently return than did their predecessors of twenty years ago.

In all these instances the transfer of population due to a demand for labour has been, or at least has purported to be, a voluntary transfer. But by far the largest of all such transfers, now happily at an end, was involuntary—I mean that of Africans carried to America to cultivate the soil there for the benefit of white proprietors.[1] From early in the sixteenth century, when the destruction of the native Indians by their Spanish taskmasters in the Antilles started the slave-trade,[2] down to our own times, when slavers still occasionally landed their cargoes in Brazil, the number of negroes carried from Africa to America must be reckoned by many millions. In 1791 it was estimated that sixty thousand were carried annually to the West Indies alone. The change effected may be measured by the fact that along the southern coasts of North America, in the West India Islands, and in some districts of Brazil, the negroes form the largest part of the population. Their total number, which in the United States alone exceeds seven millions, cannot be less than from thirteen to sixteen millions. They increase rapidly in South Carolina and the Gulf States of the Union, are stationary in Mexico and Peru, and in Central America seem to diminish. Though some have suggested their re-migration to Africa, there is not the slightest reason to think that this will take place to any appreciable extent. On the other hand, it is not likely that they will, except, perhaps, in the unsettled tropical interior of the less elevated parts of South America, spread beyond the area which they now occupy. The slave-trade is, unfortunately, not yet

[1] I do not dwell on the slave-trade in ancient times, because we have no trustworthy data as to its extent; but there can be no doubt that vast numbers of barbarians from the west, north, and east of Italy and Greece were brought in during five or six centuries, and they must have sensibly changed the character of the population of the countries round the Adriatic and Ægean. Here, of course, there was no question of climate, but slaves were caught because their captors did not wish to work themselves. The slave-trade practised by the merchants of Bristol before the Norman Conquest, and that practised by the Turkoman, recently, resemble these ancient forms of the practice.

[2] The first negroes were brought from Morocco to Portugal in 1442, soon after which they began to be brought in large numbers from the Guinea coasts. There were already some in Hispaniola in 1502; and after 1517 the trade from Africa seems to have set in regularly, though it did not become large till a still later date. Las Casas lived to bitterly repent the qualified approval he had given to it, in the interests of the aborigines of the Antilles, whom labour in the mines was swiftly destroying; but it is a complete error to ascribe its origin to him.

extinct on the east coast of Africa, but it has caused so comparatively slight a transfer of population from that continent to Arabia, the Turkish dominions, and Persia, as not to require discussion here.

Before quitting this part of the subject a passing reference may be made to two other causes of migration, which, though their effects have been comparatively small, are not without interest—religion and the love of freedom. Religion has operated in two ways. Sometimes it has led to the removal of persons of a particular faith, as in the case of the expulsion of the Jews from Spain by Ferdinand and Isabella the Catholic, an event which affected not only Spain but Europe generally, by sending many capable Spanish Jews to Holland, and others to the Turkish East. Similar motives led Philip III. to expel the Moriscoes in A.D. 1609. The present Jewish emigration from Russia is also partially —though only partially—traceable to this cause. In another class of cases religion has been one of the motive forces in prompting war and conquest, as when the Arabs overthrew the dominions of the Sassanid kings, overran the eastern part of the East Roman Empire, subjugated North Africa and Spain; and also in the case of the Spanish conquests in America, where the missionary spirit went hand in hand with, and was not felt to be incompatible with, the greed of gold and the harshest means of satisfying it. The latest American instance may be found in the occupation and government of Paraguay by the Jesuits. Finally, we sometimes find religious feeling the cause of peaceful emigrations. The case which has proved of most historical significance is that of the Puritan settlement in Massachusetts and Connecticut; among those of less note may be reckoned the flight of the Persian Fire Worshippers to Western India; the Huguenot settlements in Brazil and on the south-eastern coast of North America, destroyed soon after their foundation by the Portuguese and Spaniards, and the later flight of the French Protestants after the Revocation of the Edict of Nantes; the emigration of the Ulster Presbyterians to the United States in last century; the foundation of various German colonies at Tiflis and other places in the Russian dominions.[1] Nor ought we to forget one striking instance of expatriation for the sake of freedom—that of the petty chieftains of Western Norway, who settled Iceland in the ninth century to escape the growing power of King Harold the Fairhaired.

III. From this political side of our subject we return to its physical aspects in considering the lines which migration has tended to follow. These have usually been the lines of least resistance—*i.e.*, those in which the fewest natural obstacles in the way of mountains, deserts, seas, and dense forests have had to be encountered. The march of warlike tribes in early times, and the movements of groups of emigrants by land in modern times, have generally been along river valleys and across the lowest and easiest passes in mountain ranges. The valley of the lower Danube has for this reason, from the fourth century to the tenth, an

[1] The Tiflis Germans left Würtemberg in order to avoid the use of an obnoxious hymn-book. The Mennonites went to Southern Russia to escape military service, but the promise made to them by Catherine II. has recently been broken, and they have lately been departing to America lest they should be compelled to serve in the Russian army.

immense historical importance, for it was along its levels that the Huns, Avars, and Magyars, besides several of the Slavonic tribes, moved in to occupy the countries between the Adriatic and the Theiss. While the impassable barrier of the Himalaya has at all times prevented any movements of population from Thibet and Eastern Turkistan, the passes to the west of the Indus, and especially the Khaiber and the Bolan, have given access to many invading or immigrating masses, from the days of the primitive Aryans to those of Ahmed Shah Durani in last century. So in Europe the Alpine passes have had much to do with directing the course of streams of invaders to Italy: so in North America, while the northern line of settlement was indicated by the valley of St. Lawrence and the Great Lakes, the chief among the more southerly lines was that from Virginia into Tennessee and Kentucky over the Cumberland Gap, long the only practicable route across the middle Alleghanies.

Of migrations by sea it has already been remarked that, owing to improvements in navigation, they have now become practically independent of distance or any other obstacle. In earlier times also they played a considerable part, but only in the case of such seafaring peoples as the Phœnicians, the Greeks, and the Northmen—instances in which the number of persons transferred must have been comparatively small, though the historical results were profound. Those which most nearly approach the character of national movements were the transfer of a vigorous Phœnician shoot to Carthage, of a mass of Greeks to South Italy and Sicily, and of the Jutes, Saxons, and Angles to Britain.

The most important physical factor in determining lines of movement has, however, been climate. Speaking broadly, migration follows the parallels of latitude, or, more precisely, the lines of equal mean temperature, and not so much, I think, of mean annual heat as of mean winter heat. Although the inhabitants of cold climates often evince a desire to move into warmer ones, they seem never to transfer themselves directly to one differing greatly from that to which they are accustomed; while no people of the tropics has ever, so far as I know, settled in any part of the temperate zone. There is one instance of a North European race establishing itself on the southern shores of the Mediterranean—the Vandals in North Africa; and the Bulgarians came to the banks of the lower Danube from the still sterner winters of the middle Volga. But in the few cases of northward movement, as in that of the Lapps, the cause lies in the irresistible pressure of stronger neighbours; and probably a similar pressure drove the Fuegians into their inhospitable isle.

The tendency to retain similar climatic conditions is illustrated by the colonisation of North America. The Spaniards and Portuguese took the tropical and sub-tropical regions, neglecting the cooler parts. The French and the English settled in the temperate zone; and it was not till this century that the country towards the Gulf of Mexico began to be occupied by incomers from the Carolinas and northern Georgia. When the Scandinavian immigration began, it flowed to the north-west, and has filled the States of Wisconsin, Minnesota, and Dakota. And when the Icelanders sought homes in the New World, they chose the northernmost place they could find by the shores of Lake Winnipeg, in Manitoba.

So the internal movements of population within the United States have been along the parallels of latitude. The men of New England have gone west into New York, Ohio, and Michigan, whence their children have gone still further west to Illinois, Iowa, Oregon, and Washington. Similarly the overflow of Virginia poured into Kentucky and Tennessee, and thence into southern Illinois and Missouri; while it is chiefly from the Carolinas that Georgia, Alabama, Mississippi, Arkansas, and Texas have been settled. The present negro emigration from the Eastern States of the South is into Arkansas and Texas. Oregon is the only Northern State that has received any considerable number of immigrants from the old Slave States; and Western Oregon enjoys, in respect of its maritime position, an equable climate, with winters milder than those of Missouri.

IV. Without attempting to present a chronological view of the principal migrations by which the population of the world has been shifted, I will attempt to indicate very briefly the main epochs at which these have been most frequent or most important. They may be classed in five groups, corresponding to five periods in the history of those parts of the world of which we possess a history. The first epoch covers prehistoric times, times known to us only by faint traditions and by the results of philological and archæological inquiry. We are able to say that certain movements of races did take place before the date of our earliest written records, but unable to fix these movements to any point of time. Thus there is reason to believe that the Celtic races advanced from East to West, partly forcing into corners, partly fusing with, that earlier population of Gaul and Britain which is usually called Iberian, and of which the Basques are supposed to be representatives. Thus the Etruscans descended from the Alps into middle Italy, as the ancestors of the Latins and Sabellians would appear to have done at an earlier date. It seems probable that the Slavs and Letts came to the Oder and the Vistula from the south-east. Recent philological research lends weight to the view that the Phrygians and the Armenians, both races of the Indo-European family, were originally settled in south-eastern Europe, and crossed the Bosphorus into the seats where authentic history finds them. At some remote but quite undetermined time Aryan invaders entered north-western India, and slowly spread to the south and east from the Punjab; while, at a still earlier epoch, another race coming from the West passed through Beluchistan (where it has left a trace of its passage in the language spoken by the Brahuis) and moved south-eastward into the Dekkan and Southern India, in which its four great allied tongues, those we call Dravidian,[1] are now spoken by nearly thirty millions of people. Nor have we any materials for ascertaining the time at which the Polynesian Islands were occupied by the two races, the brown and the black or negroid, which now inhabit them, and both of which seem to have come from the East Indian Archipelago, passing from isle to isle in their canoes against the trade winds that blow from the American coast. Finally, it is to prehistoric and probably to very remote

[1] Tamil, Telugu, Canarese, and Malayalam.

times that belongs the settlement of the two American continents by immigrants from Asia, immigrants who appear to have crossed Bering's Straits, or made their way along the line of the Aleutian Isles,[1] and thence to have slowly drifted southwards from Alaska to Tierra del Fuego. That the process of settling these vast areas must have taken an enormous space of time is proved, not only by the archæological evidence drawn from human bones and other relics of primitive man, but also by the great differences, both physical and linguistic, between the various American races—differences, however, which are nowise incompatible with the doctrine of a common Asiatic origin.

The first migrations of which we have distinct historical evidence, besides those of the Phœnicians and Israelites, are the movement of the Dorians into Peloponnesus and of the Æolians and Ionians to the west coast of Asia Minor. Somewhat later, in the seventh century B.C., collisions seemed to have occurred among the nomad tribes to the north of the Black and Caspian seas, which led to the irruption of a people called Cimmerians, who advanced as far as Ephesus, and part of whom seem to have permanently settled on the south coast of the Euxine, and of a host of Scythians who ravaged Western Asia for many years, and were bought off by King Psammetichus on the frontiers of Egypt. Whether any permanent settlements followed these irruptions does not appear, but they are interesting as the first of the many instances in which the roving peoples of the steppe have decended on the settled States to the south, carrying slaughter and rapine in their train.

Passing over such minor disturbances of population as the Celtic occupation of North Italy and of that part of Asia Minor which from them took the name of Galatia, and passing over also the premature descent of the Cimbri and the Teutones into the Roman world in the days of Marius, who slaughtered them at Aix (in Provence) and Vercelli, we arrive at the third great epoch of movement—that which the Germans call *par excellence* the Wandering of the Peoples (Völkerwanderung). The usual account describes this movement to have begun from the nomads of Mongolia, living near the Great Wall of China, one tribe aggressing on or propelling another, until those who dwelt westward near the Caspian precipitated themselves on the Goths, then occupying the plains of the Dnieper and Dniester, and drove them across the Danube into the Roman Empire. Whether this was the originating cause, or whether it is rather to be sought in a lack of food and the natural increase of the tribes between the Baltic and the Euxine, there certainly did begin with the crossing of the Danube by the Goths, in A.D. 377, an era of unrest and displacement among all the peoples from the Caspian to the Atlantic, which did not end till the destruction of the Scandinavian power in Ireland at Clontarf, in 1014, and the rolling back of the great Norwegian invasion of England, at Stamford Bridge, in 1066. The Goths, the Vandals, Suabians,

[1] Some recent writers would refer the entrance of the present American races into their continent to a period so remote as that in which Asia was joined by dry land to America.

Burgundians, Franks, Saxons, Lombards settled in various provinces of the Roman Empire and founded great kingdoms. Minor tribes, such as the Alans, Rugians, and Herulians, moved hither and thither, without effecting any distinct and permanent settlement. A vast multitude of Huns ranged across Central Europe, carrying destruction as far as the Seine. Various Slavonic tribes occupied the countries along the Danube and the east coast of the Adriatic; they even filled the isles lying off the Dalmatian coast (where only Slavonic is now spoken), and descended into Greece, in the modern population of which they form a large element. The Bulgarians, a Finnish people from the Volga, settled among the Danubian Slavs and adopted their language, while the Avars, penetrating further west, held the great Hungarian plain for two centuries. Last of all, at the end of the ninth century, came the Magyars, another Finnish tribe, who retained their old language and have played a brilliant part in history. A century before they entered Hungary, the Norsemen and Danes had begun those piratical expeditions which ultimately turned into migrations, largely changing the population of eastern Britain and of northern France. At one moment the Northmen of Iceland seemed on the point of spreading from their settlement on the coast of East Greenland into North America, where they made descents at points the most southern of which have been plausibly conjectured to lie in Massachusetts or Long Island. These expeditions met with so much resistance from the natives that the idea of permanent settlement, apparently for a time entertained, was abandoned. The Norsemen had not, like the Spaniards five centuries later, and the English of the seventeenth century, the advantage of firearms, and they came from a very small nation, which could not afford to waste its men; so this case has to be added to that list of attempted colonisations which might, like the settlement of the Phocæans in Corsica and the Huguenots in Brazil, have changed the course of history had they but prospered. These seven centuries of unrest left no population in Europe unchanged, and gave birth not only to the States and nations of the middle ages and the modern world, but to modern civilisation as a whole, creating new tongues and new types of culture from the mixture of the intruding races with the provincial subjects of Rome.

The fourth group of migrations overlaps in time that which we have just been considering, and in three countries overlaps it also in space—viz. in North Africa, in Spain, and in the Thraco-Danubian lands. But its origin was wholly distinct and its character different. It begins with the outbreak of the Arabs from their remote peninsula immediately after the death of Mohammed—we may date it from the first defeats of the Romans in Syria in A.D. 632, and of the Persians in A.D. 635—and it did not quite end till the cession of Podolia to the Turks, ten centuries later, in A.D. 1695. It changed the face of Western and Southern Asia, as the Völkerwanderung changed that of Europe, yet it involved far less transfer of population, and worked more by way of permeative conquest than of migration proper. The Arabs spread over Irak, Egypt, Syria, North Africa, Sicily, and the

Iberian peninsula; twice they laid their grasp on the south-eastern corners of Gaul. Their new religion gave an Arab tinge to the literature and habits of Persia and Western Turkistan: its influence is strong to-day in the East Indian Archipelago and on the coasts of East Africa, as well as in the vast inland region from Timbuctoo to Somali Land. After their conquering force had fully spent itself, the initiative passed to the Turks, and an infusion of Turkoman blood and Mussulman ideas helped to transmute the former subjects of the East Roman Empire in Asia and Europe into the so-called Ottomans of to-day. The wave has for two centuries been visibly receding. Since 1878 we have seen the Mohammedan Beys retiring from Bosnia as they retired thirty years ago from Servia: the Circassians, and still more recently some of the tribes of Daghestan, have gone forth from their mountain homes: the Pomaks are beginning to leave Bulgaria; it is probable that in forty years more hardly a Mussulman will be left on European soil, unless the jealousies of European Powers should still keep the barbarian enthroned in Constantinople. Not less remarkable than the movement of the Arabs to the Oxus and the Tagus, and of the Turk from the Oxus to the Adriatic, was the movement of the races from beyond the Indus and the Hindu Kush into India. The irruptions which begin with the expeditions of Mahmud of Ghazni in the eleventh century brought some of the mixed Central Asiatic races, who passed as Moguls, and a probably greater number of Pathans (Afghans) into Upper India, in parts of which they have sensibly affected the character of the population. Here, too, more was done in the way of assimilative influence than by an infusion of blood, for the Mussulman bands carried their religion to the shores of the Bay of Bengal and far into the Dekkan; they introduced a new and splendid style of building and an exquisite richness of decoration; their deeds were recorded by the first regular chroniclers of India. In a fourth region, that of the countries north of the Black Sea, the irruptions of Zinghis Khan and his sons brought about some permanent changes. But it is doubtful how far the presence of such Tartar and Mongolic tribes as still remain in the Crimea and along the Volga is due to those invasions; and since, whatever their consequences may have been, they are not due to Islam, for the Mongols were heathen, they do not fall within the group of migrations we are now considering.

The fifth group begins with the discovery of America in 1492, if we ought not rather to date it from the first long voyages of the Portuguese, opening with the passage of Cape Bojador in 1435 (under an English captain), and culminating in the rounding of the Cape of Good Hope and opening of the sea route to India by Bartholomew Diaz, in 1486, followed by Vasco da Gama's voyage to Malabar twelve years later.

Four great eras of settlements belong to this group. The first is that of the Spaniards and Portuguese in tropical America. The second is that which brings the negroes from Africa to America. The third is the colonisation of the temperate parts of the North American coast by the English, French, and Dutch, in the seventeenth century. The fourth

is the immense outflow from Europe, not only to America but also to Australasia, and—in a much smaller degree—to South Africa, an overflow mainly due to the progress of physical science, firstly in introducing the use of steam for ocean voyages, and secondly in so accelerating the growth of population in Europe that the impulse towards less crowded lands became stronger than ever before. The scale of this outflow of the last seventy years has been far larger than that of any previous time, and has, indeed, become possible only because ocean transit is now so swift, safe, and cheap. The export of Chinese to America, and of Indian coolies to and fro in the tropics, is in like manner attributable to the cheapness with which they can now be carried for long distances, as well as (in the case of the coolies) to the increased demand for tropical products which the growth of population and of wealth in the north temperate zone has created.

V. Among the many questions suggested by the facts we have noted, I will advert to two or three only.

One of these bears on the analogy between the migrations of mankind and those of other animals and of plants. If the majority of our geologists are right in holding that man existed in those very remote times in which great changes of climate were still taking place, the analogy must then have been close. Races of men may in palæolithic times have moved northwards or southwards, according to the recession or advance of the great ice-sheet that once covered the northern part of the north temperate zone, just as we know that animals moved, and just as we find that certain species of plants have in our latitude sometimes occupied the low country and sometimes retired to sub-arctic regions or ascended to the tops of the loftiest mountains. It has been lately maintained that the Eskimo of Arctic America are the descendants of the Cave men of Britain and France, driven north many thousands of years ago by the growing mildness of the climate. We know that changes in the level of the sea have produced revolutions in the fauna and flora of countries, not only by affecting the course of ocean currents and thereby the climate, but also by bringing, when lands formerly separated became parts of the same continent, species from one land to another, where the incomers overpowered or expelled the old inhabitants, or became, under new conditions and through the struggle between competing species, themselves so modified as to pass into new forms. If man existed at a time so distant as that wherein Bering's Straits and the North Sea and part of the Mediterranean were dry land, we may conjecture from the influence of these physical changes upon the animal and vegetable world what their influence may have been upon him in causing tribes to move from place to place, and in bringing about alterations of racial types.

The geological record supplies ample evidence how greatly the species of animals and plants have transferred themselves from one dwelling-place to another in distant ages. The horse, in his earlier forms, was abundant in America, but he vanished there, and had been long extinct when the Spaniards of Cortez won Mexico by the terror he inspired. The camel, it appears, was originally a New World beast, and the gigantic *Sequoia* of California a European tree. But it is seldom that we are able to fix the causes which have brought about these transferences. And even with

regard to those comparatively few migrations of animals which have occurred within recent times, it is seldom that any palpably operative ground can be assigned. The latest instance of any considerable migration, apart of course from the agency of man, is the invasion of Europe by the brown rat, a native, it seems, of East Central Asia, which has practically expelled the black rat from Europe, just as the latter has been ejecting weaker rodents from South America.

In prehistoric times the movements of animals must have frequently told upon man. It appears that some centuries before our colonists entered North America the buffalo had begun to move eastward from the prairie highlands in and near the Rocky Mountains towards the Mississippi; and in order to tempt him still further eastward the Indians began to burn the forests which covered its banks and those of the Ohio River in what are now the States of Illinois, Indiana, and Kentucky. The abundance of animal food thus brought within their reach seems to have checked the progress of the tribes in the arts of sedentary life, throwing them back into the stage of hunters.

Since man, in his advancing civilisation, has begun to domesticate animals and to understand how to improve the soil and make full use of its capacities, the chief transfers of animals and plants to new regions have been due to his action. He has peopled the New World and Australasia with the horses, cattle, and sheep of Europe, turning to account tracts which might otherwise have remained a wilderness. The trees he has brought from distant regions have sometimes grown to forests, and changed the aspect of whole countries. Thus, the tops of the Neilgherry hills in Southern India have nearly lost their beautiful ancient woods, and are now, since the English took them in hand, covered with the sombre *Eucalyptus* and *Acacia melanoxylon* from Australia, or with plantations of tea from China, or of quinine from Paraguay. The landscape of Egypt, as we see it, must be quite different from that which Moses or Herodotus saw; for most of the trees belong to species which were then unknown on the Nile. Many creatures and many plants have also followed man without his will. The rats which our ships carry, and the mosquitoes whose eggs lurk in the water barrels, find their way to land and plague new countries; the English sparrow is now a nuisance in North America, though less pernicious than the English rabbit in Australia. Species of shrubs and herbaceous plants, the seeds of most of them brought accidentally from America or Asia, have thrice overrun the Hawaiian Islands, so that the present vegetation of the group is largely different from that which Cook found little more than a century ago. Thus the migrations of men, which Nature once governed, have now come to be followed by those of other creatures, and are the source of many a change upon the face of Nature herself.

VI. If we ask what has been the result of the changes we have been considering on the political organisations of mankind, and on the types of human culture, the answer must unquestionably be that they have become fewer and fewer. From the beginning of authentic history the process of reducing the number of tribes, of languages, of independent political communities, of forms of barbarism or of civilisation, has gone

on steadily, and indeed with growing speed. For many parts of the world our data do not go far back. But if we take the part for which the data are most complete, the basin of the Mediterranean, we find that now there are only nine, or at the most ten, languages (excluding mere dialects) spoken on its coasts, while the number of States, counting Montenegro, Egypt, Malta, and Morocco as States, is ten. In the time of Herodotus there must have been at least thirty languages, while the independent or semi-independent tribes, cities, and kingdoms were beyond all comparison more numerous. The result of migrations has been to overwhelm the small tribes and merge them in larger aggregates, while the process of permeation, usually, though not always, a sequel of conquest, has assimilated even those among whom no considerable number of intruders came. Sometimes the mere contiguity of the new and stronger race extinguishes the weak one, as in the case of the Tasmanian aborigines.[1] But more frequently the weaker is simply absorbed into and accepts the language and general type of the stronger, which is not necessarily the more gifted or the more civilised: and thus Britain has become Anglicised, the Celtic population retaining its languages and some of its distinctive marks only in western and mountainous corners; thus the Wends of North Germany have been Germanised, thus the Lapps of the extreme north of Europe are being absorbed by the Norwegians, Finns, and Russians, thus some of the Albanian clans are being Hellenised, thus the Talains of Pegu are becoming merged in the Burmese, as possibly the latter may ultimately be in the Chinese. The remarkable thing is that neither this blending of races, nor the transfer of races to new climatic and economic conditions, tends to develop new types to anything like the same extent as it destroys the old ones. The Crown is allowed to create one new Irish peerage for every three that die out. Nature uses her prerogative far more sparingly; she does not produce a new type for ten that vanish. Since the nations of modern Europe took their present distinct characters with their languages and their local seats between the sixth and the eleventh centuries, no new nation has appeared in Europe, nor is there now the least likelihood that any will. Neither has the settlement of European man in the New World wrought any marked changes in national types even when there has been a blood-mingling on a great scale. The average Mexican, who is by extraction more than half an Indian, is for most practical purposes, religious, social, and ethical, a Spaniard. The man of Pennsylvania or Ohio is still more palpably an Englishman, nor does the immense infusion of Irish and German blood seem likely to affect the Anglo-American type as it fixed itself a century ago. Nothing shows more clearly the strength which a well-established racial character has than the fact that the climatic and economic conditions of America have so little altered the English settlers in body, so comparatively little even in mind. Nothing better illustrates the assimilative power of a vigorous community than the way in which

[1] So the Guanches of Tenerife soon disappeared as a distinct race, though some of their blood remains; so the Maories and native Hawaiians have become greatly reduced in numbers, and are likely to become before long extinct.

the immigrants into the United States melt like sugar in a cup of tea, and see their children grow up no longer Germans or Norwegians, or even Irish or Italians or Czechs, but Anglo-Americans. With the negroes, on the other hand, there is practically no admixture; and so far as can be foreseen they will remain, at least in the sub-tropical parts of the South, distinctly African in their physical and mental characteristics for centuries to come. The same remark holds true of the white and black races in South Africa, where the process of blood-mixture, which went on to some extent between the Dutch and the Hottentots, has all but stopped.

Will this process of extinguishing and assimilating the weaker nationalities and their types of culture continue into a distant future? Have those movements of population which have been hitherto so powerful a factor in that process nearly reached their limit? Since a time long before the dawn of history the various races seem to have been always in an unstable equilibrium, some constantly pressing upon others, or seeking to escape from crowded into vacant, from cold or sterile into more genial or more fertile lands. Is the time near at hand when they will have settled down in a permanent fashion, just as our globe itself has from a gaseous state solidified by the combination of its elements into its present stable form?

Over large parts of the earth this time seems already within a measurable distance. Nearly all of the north temperate zone, except parts of south-western and south-eastern Siberia (especially along the lower Amour), and parts of Western Canada, is now occupied, and most of it pretty thickly occupied. Districts there are which may be more closely packed: the Western United States, for instance, though all the best land has already been taken up, can support a far larger population than they now have, and the same may be said of large tracts along the Alleghanies. But the attractions to emigrants become daily slighter as the conditions of agriculture grow less favourable through the inferior quality of the untouched land and the approaching exhaustion of that which has been tilled for two or three decades, not to speak of that vast natural increase of the population already on the spot, which intensifies the competition for employment. We may conjecture that within the lifetime of persons now living the outflow from Europe to North America will have practically stopped. A somewhat longer time will be required to fill not only the far less attractive parts of Northern Asia I have mentioned, but also such scantily inhabited though once flourishing regions as Asia Minor, Mesopotamia, and Persia, because a more torrid sun and atrocious misgovernment keep these regions, so to speak, out of the market. In the southern hemisphere, whose land area is far smaller, there are the temperate districts of Australia and South Africa, of which, so far as our present knowledge extends, no very large part has moisture enough to be available for tillage; while in South America there are La Plata, northern Patagonia, and the highlands of Bolivia, Peru, and Ecuador.[1] The elevation above the sea of these latter tracts gives them a

[1] The elevated parts of Equatorial Africa are much smaller, though possibly large enough to support a European population of some few millions.

tolerable climate, but their wealth lies chiefly in minerals; and the parts which are both fit for agriculture and healthy are of comparatively small extent. There remain the tropics. Vast regions of the tropics are at present scantily peopled. Most of equatorial South America is a forest wilderness. Much of tropical Africa—where it is not condemned to sterility by the want of water—seems to have a population far below what it could support, owing not merely to the wars and slave raids which devastate the country, but also to the fact that peoples unskilled in tillage cannot make the soil yield anything like its full return of crops. The same remark applies to Borneo, Celebes, New Guinea, Luzon, and some of the other isles of the Eastern Archipelago, among which only Java has as yet seen its resources duly developed. That there will be considerable migrations and shiftings of population among the races that now inhabit the tropics is probable enough. India (except the Central Provinces and Assam) and China are both filled to overflowing, and will doubtless continue to send out streams of emigrants which may in time fill up the vacant spaces in the Eastern Archipelago, perhaps in South America, perhaps even in Africa, unless some of its indigenous races should ripen into a greater capacity for patient and steady toil than any, except the Egyptian, has yet shown. But none of these tropical peoples, save the Chinese—for Japan lies outside the tropics—has a native civilisation, or is fitted to play any part in history, either as a conquering or as a thinking force, or in any way, save as producers by physical labour of material wealth. None is likely to develop towards any higher condition than that in which it now stands, save under the tutelage, and by adopting so much as it can of the culture, of the five or six European peoples which have practically appropriated the torrid zone, and are dividing its resources between them. Yet the vast numbers to which, under the conjoint stimuli of science and peace, these inferior black and yellow races may grow, coupled with the capacity some of them evince for assimilating the material side of European civilisation, may enable them to play a larger part in the future of the world than they have played in the past.

It is, of course, possible that the great European peoples, or some of them, may after a few generations acquire the power of thriving in the tropics, of resisting malarial fevers, and of rearing an offspring which need not be sent home to a cold climate during the years of boyhood. We may call it possible, because our experience is still too short to justify us in calling it impossible. But it seems so far from probable that, in considering the future of the leading and ruling races of the world, we must practically leave their permanent settlement in the tropics out of the question, and restrict our view to the two temperate zones. In these, as has been said, there is no longer room and verge for any great further removal of masses of men from one country to another. If, indeed, we were merely to look at a map indicating the comparative density of population in Northern Asia, Europe, and America, and see how much denser it is in the agricultural parts of France or Germany, for instance, than in South-western Siberia, or the North-west of the

United States and Canada, we might fancy the space remaining to be sufficient for many centuries to come. But if we were to compare such a map of to-day with a similar map of the world in 1780, and note how much of what would then have been marked as empty space, including all the vast area between the Alleghanies and the Pacific, has now been occupied, we shall realise the immense advance that has been made towards the establishment of an equilibrium of population, and the relative shortness of the future during which we can look to emigration as a remedy for the evils which afflict the toiling masses of Europe. In this respect, as in many others, the world seems to be entering on a new era, whose phenomena will prove unlike any that have gone before.

It may be thought that as migrations have been a frequent cause of war in the past, the establishment of such an equilibrium will make for peace. But it must also be remembered that the pressure of each nation on its neighbours, and of the members of each nation on one another, tends to grow more severe with that severer struggle for subsistence which increasing numbers involve, and which, after a few more generations, the outlets that now still remain will no longer relieve.

DISCUSSION.

Before the Paper,—

The Chairman, the Marquis of Lothian, explained that he had been asked to preside in the absence of the Duke of Argyll at the Inaugural Meeting of the London Branch of the Royal Scottish Geographical Society. On a more ordinary occasion it would have been his duty merely to introduce the lecturer ; but, under the present circumstances, he felt it incumbent on him to extend his remarks, in order to explain the motives that had prompted them to found a London Branch. He experienced some little difficulty in this respect, because he had heard it stated that the Society were "invading" London, and that they would have done better to stay at home. It had been pointed out to him that there was already the Royal Geographical Society in London, and that the establishment of a branch of the Scottish Society would be an invasion on their field of work. Such, however, was in no wise their intention. They did not come to compete against, or vie in any way with, the London Society. The foundation of the London Branch, which they were there that evening to inaugurate, was resolved upon in response to a spontaneous and influential request from the members of the Royal Scottish Geographical Society residing in London. It was merely proposed to do for London what the Society had done for the chief towns of Scotland : that was, to provide for their members the opportunity of hearing occasional geographical lectures. Their object was, not to have separate geographical societies in each town, but to provide centres for the diffusion of geographical knowledge, under the control of the Executive Staff at Edinburgh. There was a general idea, which he was not disposed to combat so far as England was concerned, that Scotsmen were prone to leave their own country, and that, when once out of it, they evinced no desire to return. There was probably some truth in this remark, for it was indisputable that a good many Scotsmen never did return to their native country. The fact remained, that there resided in the great metropolis of London a great many Scotsmen who took an interest in the Royal Scottish Geographical Society, and who were, of course, not

entitled to attend the meetings of the Royal Geographical Society. These had requested the establishment of a London Branch, and there seemed to be no valid reason why their request should not be granted by the Council. No hesitation would have been felt in founding a so-called Branch had the request come from one or other of the towns of Scotland ; and, since Scotsmen resident in London wished it, he did not see why their wishes should not receive favourable consideration. So far from trying in any way to lessen the influence of the Royal Geographical Society of London, he felt sure that the aim of the Royal Scottish Geographical Society, and of those who supported it, would be to do all that lay in their power to promote the efficiency of that body. Many of the members of the Royal Scottish Geographical Society were also members of the sister-society in London. He himself was a Fellow of many years' standing, and, in accepting the honour of the Presidentship of the London Branch of the Scottish Society, nothing was further from his thoughts than the idea of interfering in any way with the success of the other. He professed the greatest respect for the Royal Geographical Society. He had even, many years ago, ventured to present a paper to that Society, for which the Society had expressed unbounded gratitude, though, so far as he had been able to ascertain, that gratitude had not provided for the publication of the paper after it was read. He had then just returned from a voyage in a part of Persia in which he thought no European had ever set foot before, and he had even scaled the summit of the highest mountain in that part of the world. But, at that time, he had not made himself acquainted with scientific methods of observation. The consequence was that, when a certain Russian general who had heard of his intention to go up this mountain sent a mounted messenger a thousand miles to learn the result of his feat, all he could tell him was that he and his fellow-traveller found it more difficult to play "beggar my neighbour" at the top than at the bottom of a mountain 21,500 feet high. Since then, however, he had learned how to ascertain the altitudes of mountains and other points of interest to science.

That incident taught him a moral, viz., that the scientific equipment of those who travelled about the world might be improved by societies such as theirs. People in general did not understand the importance of the science of geography. They looked upon it as a science which consisted in studying maps, in knowing the names of the prominent points on the coast-line and of the capitals of countries, and so on. Looked at from a scientific point of view, geography embraced a great deal more than that. In these days of restless international competition, it was necessary to find markets for our manufactures ; and the Society could render no greater service than to carefully investigate the commercial situation in, and requirements of, the various countries of the world. Then there was the study of man in relation to his geographical surroundings. That was a very important department of inquiry, as was illustrated by the complicated Eastern Question, the settlement of which seemed as remote as ever. Perhaps the political aspects of geography were the most important of all. An insufficient knowledge of the boundaries of states was responsible for many wars in the past and might be the cause of other wars in the future. If there had been a better appreciation of geography they would never have had such a boundary as that which had been agreed upon to separate Canada from the United States. It was certainly not a scientific frontier. During the last few years political geography had proved very useful in respect of the delimitation of territories in Africa. Without such knowledge the Government could hardly have settled the partition of lands between the rival Powers in the way that it had done ; and for the informa-

tion which had enabled it to carry out this demarcation the Government was indebted to societies such as theirs. Had this knowledge of political geography been utilised in the past there would have been no Delagoa Bay question, no dispute about the Bering Sea, nor many other cases that might be mentioned.

The aims and scope of the Royal Scottish Geographical Society were, perhaps, wider than those of its sister society in London. They did not restrict themselves so much to topography, nor did they draw hard and fast limits to the scope of scientific geography. They sought to obtain the greatest amount of information upon all the subjects to which, among others, he had referred, and by means of lectures at different centres to diffuse that information. Another point was that the Scottish Society admitted ladies, on an equal footing, to all the privileges of Membership. He claimed that ladies had shown themselves capable of geographical exploration and research, and of writing interesting and valuable books on the subject. He referred in particular to the book recently published by Miss North, and that by Mrs. Bishop (Miss Bird). He maintained that this justified the Scottish Society in their decision to admit ladies to their ranks.

In conclusion, he expressed the hope that he had justified the existence of a London Branch of the Royal Scottish Geographical Society. He trusted that the Society would meet with a cordial welcome at the hands of the sister society, and that they would lend each other every assistance in the furtherance of the interests of the science which they studied in common.

The Chairman then introduced Mr. James Bryce, whose presence that evening was, he said, an indication of the catholic sympathies of the Society, and might be taken as an earnest of the desire of the Society to take a wide view of the science of geography.

After the Paper,—

Colonel Sir Charles Wilson, in proposing a vote of thanks to the lecturer, said that he had listened with the greatest interest to Mr. Bryce's most admirable and instructive address. The subject was not only fascinating in itself, but was of the greatest practical importance. It was only by knowing and understanding what had occurred in the past that it was possible in any way to forecast what was likely to happen in the future. With reference to some of the lecturer's remarks, he observed that in years gone by he had been on the Pacific Coast of America when gold was discovered in British Columbia. At that time no Chinese had emigrated to that part of the world, yet some of the native Indians were so like the Chinese in face, that the miners used to call them Chinamen, much to their disgust, because they resented being taken as Chinamen. Some very interesting changes were taking place in certain parts of Asia Minor. Greek immigration had set in from the islands to Asia Minor; the Greek population had increased beyond the means of the islands to support it; and so the Greeks crossed over to the fertile valleys and coast of Asia Minor, just as they did in ancient days. Many places on the west coast of Asia Minor, where twenty-five years ago there were no Greeks, were now entirely Greek, and the race was still spreading with great rapidity. The Circassians driven out of Bulgaria had largely settled in Asia Minor. They were people of a more advanced civilisation than the natives of that part of the world. They brought with them their four-wheeled carriages, and, having settled down, they felt the necessity for roads. Roads had therefore been made; and now one could travel comfortably throughout the country from one part to another. He then alluded to the emigration of German colonists into Palestine as another instance of the introduction of a higher civilisation; they

introduced carts and made very serviceable roads wherever they settled down. He concluded by asking them to pass a cordial vote of thanks to the lecturer for his exceedingly interesting and instructive address.

Mr. E. G. Ravenstein, in seconding the vote of thanks, agreed that the subject was one of very great interest, though, of course, in the short time at his disposal, it was manifestly impossible for the lecturer to do more than touch upon one or two of the principal points. He himself had given a good deal of attention to the movements going on which were changing the faces of countries and the types of their inhabitants. These movements of population certainly furnished ample material for reflection, and, notwithstanding the ridicule that had been heaped on certain forecasts, he thought their descendants in ages to come would have a great deal more trouble in dealing with emigrants than they themselves had in dealing with Russian Jews and other aliens. That time, however, was sufficiently remote for even the youngest among them to rest assured of dying in peace. With regard to the equilibrium of the world's population, he would only draw attention to what seemed to be an acknowledged fact among reasonable, sensible people—for people were by no means all reasonable and sensible—viz., that Europeans could not colonise Tropical countries. They knew, however, for certain, that even Scotsmen could live there for years, drive Negroes, and amass large fortunes, and then return to Scotland and occupy whole mountains, access to which he hoped would never be denied to their Fellows. It was not, however, absolutely necessary that Europeans should themselves occupy the Tropics. They might continue to inhabit the Temperate climes and make the Tropics produce the food they wanted, sending them in return their manufactures.

The President, in communicating the vote of thanks to the lecturer, observed that it would have been difficult to have alighted upon a more interesting subject, on the occasion of the inauguration of the London Branch of the Society. He mentioned that Mr. Bryce had latterly been in bad health, to the extent of necessitating the postponement of the Inaugural Meeting ; and he expressed his pleasure at the fact that he was now restored to health.

Mr. Bryce, in acknowledging the vote of thanks, thanked his audience for their kind appreciation and for the attention with which they had listened to an address that was a good deal longer than it ought to have been. The subject, however, was so vast, that he had experienced the greatest difficulty in compressing it at all.

Mr. Faithfull Begg, in proposing a vote of thanks to the President, said he would like to extend the remarks he had to make by an expression of gratitude to his Lordship for having accepted the post of President of the Branch. He himself was one of those benighted Scotsmen who found themselves lost in the wilds of London, and had moved in the matter of establishing a local Branch of the Society. He confessed himself ignorant as to whether they had come hither by transference, dispersion, or permeation ; whether, in the language of the lecturer, they had come south for want of food, on account of the exigencies of war, or for something else they wanted, such as labour. That he could not say ; but here they were, and they harked back to the institutions of their country, and asked the Royal Scottish Geographical Society to open a Branch in London. When they saw that their efforts were likely to be successful, they had to cast about for a President or Chairman, and he considered they had been very fortunate in securing the Marquis of Lothian in that capacity. He, their chairman, was a Scotsman of Scotsmen,

and in himself possessed all the qualities that went to make a man truly great. He had received recognition of this fact in that he occupied the highest representative post in connection with their native land, viz., that of Secretary for Scotland. He did not know whether their President had any misgivings in accepting the post of chairman of the new Branch of their Society. But the large and brilliant assembly present that night should remove any lingering feeling of doubt. He concluded by asking the vote by acclamation.

The President, in thanking the meeting, said that the presence of so many gentlemen who were eminent in the various departments of science had added considerably to the success of that evening; and he begged to thank them for their attendance.

THE DISCOVERY OF AMERICA.

By W. A. Taylor, M.A., F.R.S.E.

In the fifteenth century Europe awakened to new life after the torpor of the Middle Ages. The feudal system was dying out, and the Church's authority was no longer accepted with unquestioning obedience. In England the strength of the barons was broken by the Wars of the Roses, and a strong monarchy was founded by Henry VII. France, no longer exposed to the invasions of the English, commenced a more prosperous career under the prudent, if unscrupulous, policy of Louis XI.: while Aragon and Castille, united by the marriage of Ferdinand and Isabella, were engaged in their last struggles with the Moors. While these nations were consolidating themselves, and preparing for their future destinies, maritime enterprise was carried on by Italy and Portugal. During the Middle Ages the trade with the East was in the hands of the cities of Italy, particularly Venice and Genoa. Early in the twelfth century the latter, conspiring with the Greeks, drove her rival out of the Black Sea and monopolised the trade with India by the overland route; and their efforts to obtain a share with Venice of the trade with Egypt gave rise to a long series of wars with varying success, until the failure of an attack on Venice in 1380 dealt a fatal blow to the Genoese power. Fresh misfortunes awaited her in the first half of the fifteenth century through the loss of her stations on the Black Sea by the advance of the Turks, and the taking of Constantinople in 1453 and the loss of Chios finally put an end to her overland traffic.

But though Genoa rapidly declined in power and prestige during the course of the fifteenth century, it is to the seafaring skill and experience of her sons that the great discoveries made by the Spanish and Portuguese are principally due. The Spanish vessels were built after the model of the Italian, and from 1317 to 1448 a Genoese family, the Pessagni, held the post of admiral in Portugal.

Before enumerating the discoveries of Portugal it will be well to consider the state of geographical knowledge before Henry the Navigator sent forth his explorers. In Asia the Arabs, who held the trade with India, and sold their goods to the Venetians, were the chief travellers.

Of these the most important was Ibn Batuta, who in 1342 quitted Delhi on an embassy to China, and visited Sumatra. Of much more consequence to European enterprise was the voyage of Marco Polo, a Venetian, who at the end of the thirteenth century reached China and brought back reports of Cipango, or Japan, and of the islands of the Eastern Archipelago. Genoese missionaries seem also to have penetrated into China, and one of them, Oderico da Pordenone, went in 1317 to Java. Still, on examining Ptolemy's map, one is astonished how little the knowledge of the Old World had advanced since his time. Of the north of Asia such ignorance prevailed, even late in the fifteenth century, that, when English and Dutch mariners went in search of a north-east passage to Cathay, they supposed that, after passing the Vaigatz Strait, they would be able to sail south-eastwards straight to their destination. Even of the Russian kingdom little seems to have been known until Chancellor visited Moscow in 1553, though commerce had existed with the Mediterranean through the Black Sea from the ninth century. In Africa the Nile is drawn on Ptolemy's map issuing from two lakes in the far interior, and the Blue Nile, Socotra, and part of the western coast are represented. There was also a tradition in ancient times that the continent had been circumnavigated; and it is certain that Hanno sailed along the west coast as far as Cape Blanco, if not, as some commentators on his *Periplus* affirm, to Cameroons. All knowledge of this coast had been lost during the Middle Ages, and the only additional information acquired was the reports heard by Marco Polo of the existence of the Island of Madagascar. Cape Bojador, however, appears on a Catalan map of 1375.

To the north-west exploration was carried on by the Norwegians and Danes. There is a report that Irish missionaries established a station on the American side of Davis Strait as early as 795, or a little later; but the first discovery of America on which reliance can be placed was in the year 1000, when Leif Erikson sailed from Greenland and touched successively at Helluland, Markland, and Vinland, which are supposed to have been Newfoundland, Nova Scotia, and Rhode Island or Massachusetts, respectively. Of the voyage of the Zeni brothers, Madoc, and others, it is unnecessary to speak, as too much uncertainty is attached to them.

With Portuguese discovery the name of Prince Henry the Navigator will always be connected. In 1418-20 two squires of his household discovered, or rather rediscovered, Porto Santo and Madeira, for these islands appear on a Genoese map made in 1351. Gradually the Portuguese navigators extended their voyages along the coast of Africa, and in 1444 Pope Martin v. granted a bull confirming to Portugal all the lands she might discover eastward of Cape Bojador. Cadamosto, a Venetian in Portuguese service, sailed as far as the Rio Grande; Diogo Cão discovered the mouth of the Congo; and in 1486 Bartholomew Diaz rounded the Cape and anchored in Algoa Bay. The voyage of Vasco da Gama, which gave a death-blow to the trade of the Italian cities, did not take place until 1498, five years after the discovery of Columbus.

Of the life of this great navigator, whose memory will this year be

celebrated, we do not purpose to give any detailed account, but shall confine ourselves to the story of his discovery. Though more than one town contends for the honour of being his native place, it is generally conceded that he was born in Genoa. His early life was spent on the sea, and in 1477 he visited Iceland, where he probably heard rumours of the voyage of Leif Erikson. It is doubtful, however, whether he was at all indebted to any information he may have acquired there for his ideas. Vinland, and the other countries visited by the Norwegian seafarer, were probably regarded as islands connected geographically with Greenland, whereas Columbus hoped to sail westwards to the coasts of Asia. In consequence of the capture of Constantinople the wisdom of the ancients had been spread abroad in Italy by Greek refugees, and the invention of printing had contributed to the dissemination of the works of the old authors. The legends of the island of Antilla and Plato's Atlantis were revived, and many fables of more modern voyagers were listened to with credulity. As appears from his correspondence with Toscanelli, it was on Ptolemy's map that Columbus based his theories. That geographer had divided the circumference of the Earth into 360 degrees of longitude, and had determined the absolute distances eastward and westward with a wonderful degree of accuracy, considering the resources at his command; but, having adopted the supposition of Marinus that a degree on the Equator, or on any other great circle, measured 500 stadia, or about 50 geographical miles, he was led to extend his globe enormously to the east and west as measured in degrees of longitude. Comparing, then, the maps of Ptolemy and Marinus, Columbus formed the opinion that fifteen hours of longitude were known to the ancients, to which the Portuguese had added another by the discovery of the Azores and Cape Verd Islands. There still remained one-third of the circumference to be explored. This, however, he imagined to be of no very enormous extent, placing great faith in the opinion of Alfraganus, an Arabian, who had given a much smaller estimate than other cosmographers of the length of a degree, and consequently considerably reduced the theoretical dimensions of the Earth. Besides this, it was uncertain how much of the intervening space was occupied by the eastern extremity of Asia and the adjoining islands. It might be, as depicted in Behaim's globe of 1492, that a voyage of moderate length would bring an explorer from the Azores to the shores of Cathay. Toscanelli encouraged Columbus in seeking a western route to this country, the splendour of which had been extolled by Marco Polo, and expressed his opinion that the distance thither from Lisbon could not be more than 4000 miles. He also sent a map based on that of Ptolemy and on the explorations of Marco Polo.

Columbus married a Portuguese wife and settled in Lisbon. Here he heard reports of carved wood drifted on to the Madeira Islands, of reeds and wood picked up unlike any growing on the islands or the coasts of the mainland, and of the corpses of two men of strange appearance cast up on the island of Flores, with many other tales too marvellous to be believed in the present day. Living in the country, it was natural that Columbus should first lay his scheme before the Government of Portugal.

His native city, weakened by disastrous wars, stripped of most of her colonies, and a prey to internal dissensions, was not in a position to undertake such a mighty enterprise; whereas Portugal, situated on the confines of the known world, and in great measure isolated from the struggles of Europe, was then the pioneer in maritime discovery, and the work commenced by Prince Henry was being actively prosecuted by King João II. A *junto* was summoned to consider the plans of Columbus, with the result that they were declared to be extravagant and visionary; and a disgraceful attempt having been made to rob him of the fruits of his labour by sending out secretly an expedition in the direction indicated on his charts, he turned his back on Portugal in 1484, and carried his plans elsewhere. Portugal was not, probably, very eager to entertain a strange and adventurous scheme, when every year increased her hopes of reaching the Indies by a route which, according to tradition, had already been traversed, and the length of which could be estimated with some approach to accuracy.

In Spain a native of Genoa, which thirty years before had taken prisoner Alphonso of Aragon, could not expect a very warm reception. Just at this time, also, the two rival Moorish kings had formed an alliance, and the Court was busy with preparations for a grand campaign. The Moor, no doubt, had degenerated, and it was not possible that two races so distinct in race, religion, and customs could live peaceably together within the narrow limits of the Peninsula; but one cannot help feeling some regret at the overthrow of a people who did so much for science, and from whom many of the Italian and French men of learning received instruction. The compass, which came into general use in Europe about 1420, was introduced by the Arabs, and the astrolabe, invented by Hipparchus, was preserved and improved by them. At length, after waiting during the summer and autumn of 1486 at Cordova, Columbus obtained an audience with the King, and a conference was appointed to meet at Salamanca and consider the scheme. Pythagoras, Ptolemy, and other Greek philosophers held the doctrine of the rotundity of the Earth, and had some notion of gravity. Cardinal de Cusa, indeed, early in the century, had adopted the heliocentric theory, partially anticipating Copernicus. But as a body the prelates of the Church—and of such the conference at Salamanca was mainly composed—were not remarkable for their enlightenment or for breadth of thought. Lactantius and Augustine were quoted to prove the absurdity of Antipodes, where people, it was imagined, must walk with their heads hanging down and all nature be inverted. If a ship should indeed succeed in sailing down to India, it was supposed that, the rotundity of the Earth forming a great acclivity, it would be impossible to return with the most favourable wind. Some converts, however, Columbus did make in this learned body, and after years of waiting succeeded in gaining the enthusiastic support of Isabella, who undertook to supply the necessary funds. A great incentive held out by Columbus to the Spanish sovereigns was the prospect of spreading the Catholic religion in distant lands. The wars with the Moors had long been looked upon as crusades, and the Church, lending its assistance to the civil power, had acquired a more absolute

sway than it exercised in any other country. The negotiations terminated, and the privileges Columbus was to enjoy in any lands he might discover defined, the navigator set sail from Palos on August 3rd, and steered for the Canary Islands, whence he intended to strike due west. He had three vessels, the *Santa Maria*, the *Pinta*, and the *Nina*, of which only the first was completely decked. On his course westward he noticed the variation of the needle, a discovery also claimed for Sebastian Cabot. With unequalled patience he soothed the fears of his crew, and persuaded them to persevere in their great undertaking when they were ready to mutiny, and in October came to anchor at San Salvador, which is generally considered to have been Watling Island or Cat Island. In a paper read by the Hon. George Gibbs before the New York Historical Society in 1846, the honour was claimed for Grand Turk, the description given in the original journal of Columbus, first published in 1825, applying more accurately to this island than to the others. On his second voyage, in 1498, Columbus discovered Trinidad, and sailed along the coast of South America, but it does not appear that he was aware that he had found a new continent: indeed, he died in the belief that the West Indies lay off the coast of Asia.

There has been much discussion on the question whether Columbus should be considered as the first discoverer of the American continent; and, strictly speaking, it must be conceded that he was not. Passing over the voyage of Leif Erikson, the memory of which had been preserved only in dim tradition, it is certain that John Cabot, a Venetian, who settled at Bristol, had reached Labrador and Newfoundland before Columbus sighted the South American coast, whether the Venetian's voyage took place in 1494, as stated by D'Avezac, or, as generally reported, in 1497. This bare fact, however, should not detract from the fame of the great navigator. The idea of seeking India by a western route is his alone, and he boldly sailed into an ocean of unknown extent, with no tradition of former voyages to encourage him.

If, again, we judge of the voyages of Columbus by their results, there can be no doubt of their paramount importance. It may be doubted whether the discovery of the bleak coasts of Labrador and Newfoundland would have aroused the same enthusiasm in the maritime nations of Europe that was excited by reports of the luxuriant islands of the Tropics; and the numerous voyagers who, in the next half-century, explored the coasts of the new continent, and circumnavigated the globe, undoubtedly followed in the wake of Columbus.

On his return to Spain, in 1493, a bull was obtained from Pope Alexander VI. granting to Spain all countries that might be discovered within 180° to the west, just as eastern lands had been secured to Portugal by Martin V. The line of demarcation between these Powers was fixed at 100 leagues to the west of the Azores, being at the time nearly coincident, as far as could be ascertained, with the line of no magnetic deviation. The following year, at the instance of King João of Portugal, who thought that he might thereby acquire some advantage from future discoveries to the west, this line was moved to 370 leagues from the Azores; and after the discovery of Brazil it was supposed to run

through the western mouth of the Amazons and, in the south, beyond the Rio de la Plata. When the two nations met on the other side of the World, this division, owing to the impossibility at that period of determining longitude with any degree of accuracy, gave rise to many disputes, the discussion of which lies beyond the scope of this article.

Considering, lastly, the effects of the discovery of Columbus, and of the opening of a sea-route to India by Vasco da Gama, we find that the commerce of Europe was completely revolutionised. The traffic with India, which had been conducted by the Arabs, was taken out of their hands, and consequently the Italian cities rapidly declined in power and wealth. Goods could be transported at much lower cost by sea, and the nations of Western and Northern Europe were situated more favourably as regards communication both with the eastern and the newly discovered western lands. None has ultimately profited so much by the important events of the end of the fifteenth century as our own country. It is hard to say what might have been the result if Henry VII. had not sent too late his favourable answer to the overtures of Columbus, and if Englishmen, instead of Spaniards, had achieved the enterprise; but we are inclined to believe that the possession of extensive territories abroad would have hindered the development of the kingdom, and proved a source of weakness during the troublous times that followed in the next century. Spain certainly furnishes a warning rather than an example. Her long wars with the Moors, which had left her no leisure to develop her intellectual life, only just concluded, she went forth, with brilliant intrepidity but full of ignorance and bigotry, to conquer new lands and rule others before she had learned to rule herself, and her mighty empire in the West has long ago split up into petty republics constantly agitated by revolutionary strife. Meanwhile, England was gaining skill in navigation on many exploring voyages to the north-east and north-west, and learning maritime warfare in buccaneering expeditions along the coasts of the Spanish Possessions. At length, having passed through her internal troubles, she was able to defy the power of Spain, supported, as it then was, by the resources of the Empire, and to lay the foundations of a vast colonial dominion which has flourished to the present day.

This year the fourth centenary of the first voyage of Columbus will be celebrated in many towns, both of the Old and New World, and nowhere more appropriately than in Genoa, whence sprang not only Columbus but also those mariners who gave the first impulse to maritime exploration beyond the Pillars of Hercules. But Anglo-Saxons have no less cause than Italians and Spaniards to remember the event which has opened out to them boundless fields for the exercise of their energy and enterprise.

NATIONAL FUNCTIONS OF THE IMPERIAL INSTITUTE.

THE "Imperial Institute of the United Kingdom, the Colonies, and India, and the Isles of the British Seas" [1] received its Charter of Incorporation from Her Majesty the Queen-Empress on 12th May 1888. Its origin was due to the initiative of H.R.H. the Prince of Wales, and was inspired by the patriotic motive of giving permanent national expression to the wave of loyalty that swept the Empire from end to end on the celebration of the jubilee year of Her Majesty's reign. The Colonial and Indian Exhibition of 1886, by its remarkable success, attracted universal attention to the high standard of industrial development and to the progress of the arts and manufactures within the British Empire. To many it was a revelation of the vast resources and high degree of civilisation of countries under the British flag. It was, therefore, reasonable to infer that, if a single exhibition of this kind were capable of diffusing useful knowledge, and of drawing closer the bonds of union between citizens of a World-empire, a very practical object would be served by the establishment in London of a permanent Institution, the main feature of which would be to organise and facilitate intercourse between the subjects of Her Majesty for the purposes of social, national, and industrial advancement. A community of interests and of sentiment having been recognised as existing between the Mother-country and the Colonies, it remained for the promoters of this national undertaking to organise a practical scheme for the establishment of an Institution, on a thoroughly representative basis, which should serve for all time as a place of reunion for the Queen's subjects no less than as a memorial of the growth and consolidation within the Victorian age of the greatest Empire the world has ever known. Such an institution, having distinct national functions, now exists at South Kensington in London.

It is intended that the Imperial Institute should illustrate, by means of a permanent museum and frequent exhibitions, the arts, manufactures, and commercial resources of the Empire, and the material and moral progress of its citizens; that it should develop a national system of technical education, advance commerce, and promote business and social intercourse by organised inter-Colonial discussions and other means. One of its main functions will be to collect, collate, and disseminate such information as may most profitably conduce to the fulfilment of these objects. Comparatively few will have the advantage of visiting the Imperial Institute itself; the vast bulk of Her Majesty's subjects beyond the seas will naturally look for information to the publications of the Institute and to its organised agencies in the Colonies and British Possessions abroad. British and Colonial merchants, instead of mur-

[1] The official designation of the Institute is, geographically speaking, inadequate. The "Isles of the British Seas" is a redundant expression. Contiguous islands may be included under the United Kingdom. The oceanic and maritime possessions of Great Britain do not lie exclusively in British seas. British dependencies and protectorates, not to mention spheres of influence, are clearly intended to be represented on the Governing Body of the Institute, and have contributed to its funds. All of these might have been included under the general term of "British Settlements on Land and Sea."

muring at the supineness or indifference of the Colonial Office, may confidently expect assistance and encouragement from the Imperial Institute, which, enjoying a semi-official standing, will be in a position to act as an intermediary between Governments and the public, and to acquire authentic and trustworthy information. The programme of the Institute is sufficiently comprehensive, and includes the exercise of functions that, for very good reasons, are shirked by the Home Government. But British subjects all over the world, having contributed to the foundation and maintenance of the Imperial Institute, may reasonably look for some *quid pro quo*; nor is it likely that they will be disappointed, for the funds of the Institute are limited, and can only be made adequate by perennial contributions from the Colonies. The Colonies themselves are, moreover, fully represented on the Board of Governors, and are in a position to give effect to Colonial aspirations.

The Royal Scottish Geographical Society having performed, within the limited means at its command, some of the local functions of the Imperial Institute, views with interest this great national project of supplying the metropolis of the Empire with so influential an agency. We believe that the functions of the Institute, if exercised in an enlightened spirit, will conduce more than any other means to the consolidation of the British Empire. Imperial Federationists have only theories to advance in support of their propaganda, but the Governors of the Imperial Institute have it within their power to put many of these theories into practice. Instead, therefore, of an artificial amalgamation of interests, we may look with confidence to many practical instances in illustration of national unity. The consolidation of the Empire must result from natural growth, stimulated, of course, by the due recognition of a community of interests. Knowledge must precede and inspire political action. The Colonies themselves are too busy with their local interests, and too involved by the necessities of their individual political development, to give sufficient attention to the solution of world-problems. If we may be permitted to say so, they are still in the stage of arrogant, self-confident youth, and have yet to find their level in the world. They have been indulged and assisted by a benevolent Mother-country. They are, therefore, inclined to exact too much as the price of their adherence to the fortunes of the Empire, discounting the promise of their youth as a set-off against the blood and money expended by the United Kingdom in the creation of her Colonies. Only time can bring wisdom to them, but no opportunity should be lost in hastening that time. The relations between the Home Government and the Colonial Governments are necessarily at the mercy of high political considerations which even an educated public opinion is apt at times to misconstrue. But a semi-official agency like the Imperial Institute, not being fettered by red-tape and consolidated interests, but free to move with the times and towards the avowed objects of conciliation and mutual help, should occupy an unique position in this respect. Under its distinguished patronage and wide public support, it is to be hoped that its promise will be fulfilled. Certain it is that no other public or semi-public institution in this country offers the same advantages for strengthening the bonds of

sympathy between the United Kingdom and her Colonies. The responsibility is great, but it is a responsibility in which the whole Empire has elected to share, and therefore cannot escape.

The following particulars as to the foundation and scope of the Imperial Institute have been gleaned from a pamphlet recently issued by the Executive :—

The foundation-stone of the Institute was laid by Her Majesty on the 4th July 1887, in presence of a brilliant and representative assemblage of 10,000 spectators.

Prior to that event, the Prince of Wales, as the permanent President of the Institute, appointed an Organising Committee, under the Chairmanship of Lord Herschell, with Sir Frederick Abel as Organising Secretary and Sir Somers Vine as Assistant-Secretary. The Committee framed a scheme of work and of representation which was published in December 1886. A Special Committee, consisting of Lord Herschell, Lord Thring, Sir Frederick Abel, and Mr. Hollams, was occupied during 1889 and 1890 in drafting a form of constitution, which was adopted by the Organising Committee on the 5th March, and was approved by Royal Warrant on 21st April, 1891. "In accordance with the provisions embodied in the constitution, the several Colonial authorities and the Indian Government were requested, in 1890, to nominate their representatives to serve on the Governing Body. The county councils and leading municipalities comprised within the several electoral districts, into which the United Kingdom has been divided for the purposes of the Imperial Institute, were invited in 1891 by the Prince of Wales to meet and to appoint their representatives; and the various institutions and societies entitled to be represented upon the Governing Body were also called upon to forward the names of their representatives. . . . Regulations were also prescribed by the Special Committee, and embodied in the constitution, with respect to the election, subscriptions, and privileges of Fellows of the Institute."

The concluding meeting of the Organising Committee and the first meeting of the new Governing Body were held, under the presidency of the Prince of Wales, at Marlborough House on 23d July 1891. The first meeting of the Executive Council was held on the same date within the Council-chamber of the Imperial Institute, under the presidency of Lord Herschell, Chairman of the Governing Body.

Lord Herschell visited India in 1888, and Sir Somers Vine between 1888 and 1890 travelled through the Colonies and India, in order to make known the objects of the Institute and to secure adequate support and co-operation.

As to funds, it is stated that at the beginning of 1892 the donations received amounted to £400,353; those promised, but not transmitted amounted to £12,500: thus bringing the full value of the subscription-list to about £413,000. Of this sum £236,862 was raised by private subscriptions in the United Kingdom. India contributed by the same means £101,550. Canada produced £20,000 as an official donation, and £87 by private subscription. Other Colonies and British Settlements contributed sums varying from £11,319 (Victoria) to £1, 10s. (Ascen-

sion). The private subscribers included fifty-eight foundation donors of £500 and upwards, and nearly 500 contributors of not less than £50 each. The subscription-lists sent in from different parts of the Empire comprised individual donations varying from £100,000 to one penny. The total number of subscribers amounted to several millions, composed of all classes of the Queen's subjects.

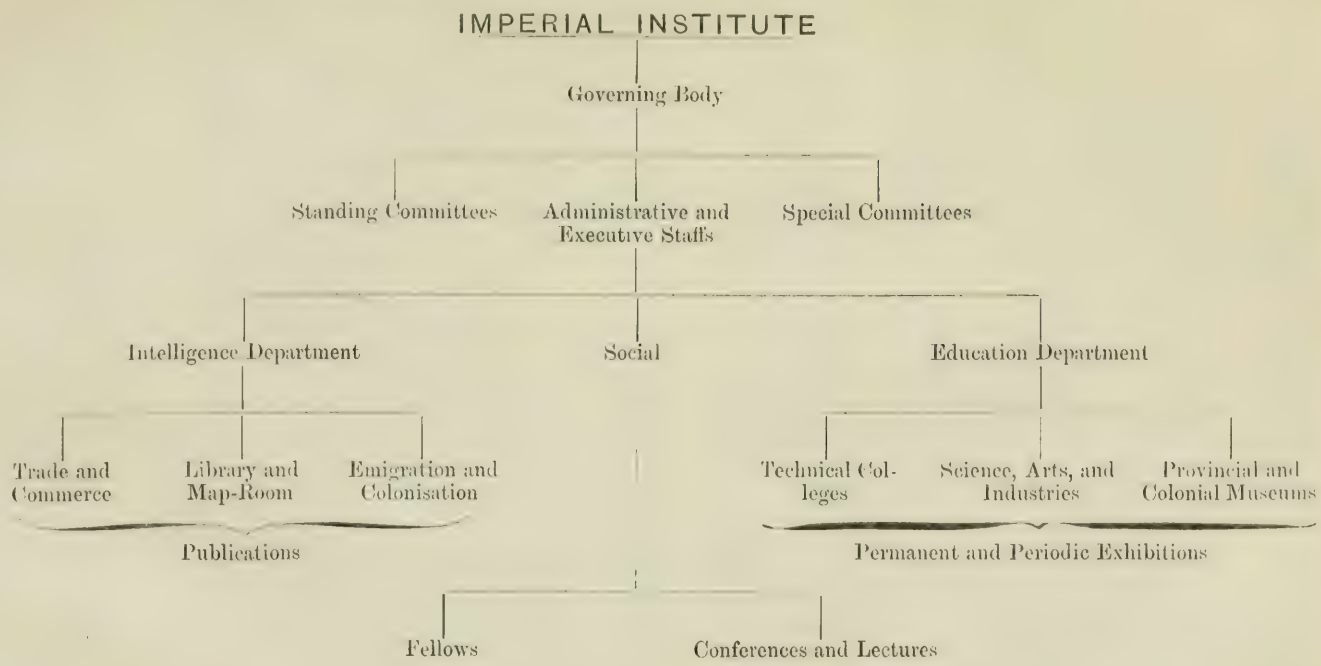
The Report goes on to say: "The particulars here given do not include the financial arrangements made or being made by several of the Colonies for establishing the collections to be displayed and providing for their guardianship and annual maintenance. Satisfactory communications have already been received from India, several of the Canadian provinces, New South Wales, Victoria, Queensland, Tasmania, Cape Colony, Natal, the West India Settlements, and the East African Protectorates (*sic*) as to their willingness to prepare and maintain adequate collections of their commercial and economical products."

"A Permanent Endowment Fund has been, by the powers contained in the Charter of Incorporation, appropriated from the public subscriptions, and is vested in three trustees (the Duke of Fife, the Earl of Rosebery, and Lord Herschell). It now stands at £141,520, and produces an annual income of £4000."

As this is the annual income of some of our leading scientific societies, it is to be hoped that means may be found to very materially increase the amount for the purposes of the Institute. With such a meagre income at its command the Institute cannot hope to carry out all the objects it has set itself. The mere up-keep of the building and the expenses of administration are serious items in themselves. But, doubtless, it is hoped that the subscriptions of Fellows, who obtain the advantages of a club, may contribute to the annual income of the Institute. A substantial annual grant from Government and supplementary grants from the Colonies are surely not too much to expect when the important national functions of the Institute are taken into consideration.

The total outlay upon the buildings and their appurtenances as they now exist, or are in course of completion, stands at £279,000. But an additional £80,000 will be required to complete the original design. The prevailing style of the building, which is executed in Portland stone and red-brick, is a free rendering of the Rénaissance. The structure, which is most imposing and of great architectural beauty, covers nine acres of ground. On the principal floor are the Administrative and Executive offices, the Fellows' rooms, and the conference rooms. The ground-plan of the buildings offers ample accommodation for the permanent exhibitions which, it is understood, will be maintained by the United Kingdom, the Colonies, and India. There are also a library and a modest map-room. The map-room will require to be larger if it is to accommodate—as it should—all the official maps published in the British Empire. The Institute should not be content with anything short of a complete collection in this respect, especially as the maps could, we presume, all be obtained as donations from the respective Governments.

DIAGRAM ILLUSTRATING THE FUNCTIONS OF THE



Our remarks on the purposes and objects of the Institute may be supplemented by the following quotation from the Charter of Incorporation :—

1. The formation and exhibition of collections representing the important raw materials and manufactured products of the Empire and of other countries, so maintained as to illustrate the development of agricultural, commercial, and industrial progress in the Empire, and the comparative advances made in other countries.

2. The establishment or promotion of commercial museums, sample-rooms, and intelligence offices in London and other parts of the Empire.

3. The collection and dissemination of such information relating to trades and industries, to emigration, and to the other purposes of the Charter, as may be of use to the subjects of the Empire.

4. The advancement of trades and handicrafts by exhibitions of special branches of industry and commerce, and of the work of artisans and of apprentices.

5. The promotion of technical and commercial education, and of the industrial arts and sciences.

6. The furtherance of systematic colonisation.

7. The promotion of conferences or lectures in connection with the general work of the Institute, and the facilitating of commercial and friendly intercourse among the inhabitants of the different parts of the British Empire.

8. The doing anything incidental or conducive to carrying into effect all or any of the foregoing purposes.

Perhaps, however, the scope and functions of the Institute may best be seen from an examination of the diagram over-page, which we constructed after a perusal of the above-mentioned Report.

It will be seen, from what has been said, that the functions of the Institute have to a certain extent been performed by institutions already in existence in this country; and, doubtless, measures will be taken to avoid friction or competition with these bodies. Indeed, their labours might be utilised with advantage, for it is difficult to see how the Imperial Institute, with its limited funds, can otherwise efficiently carry out its comprehensive programme. Co-operation with them would act as a stimulus, and be productive of good work, not to speak of economy of labour. In short, the Imperial Institute, by affiliating public bodies throughout the Empire that already perform some of its local functions, would materially lessen its own work, and thus aid in itself becoming the lever of all their activities. Its ideal position in the Empire should be the common meeting-place of all recognised public institutions which have for their objects the study and development of the resources of the Empire.

A. Silva White.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A., F.R.S.E.,
Assistant Librarian, R.S.G.S.

AFRICA.

The Climate of Mashonaland.—Dr. W. G. Black has forwarded to us a few notes taken by Dr. Hugh Rayner, surgeon of the Grenadier Guards, who accompanied Lord Randolph Churchill on his recent expedition to Mashonaland. He found it impossible to take himself a complete series of observations, as all the trekking was done at night, and, therefore, a reading of the minimum thermometer could not be obtained. At no station of the British South Africa Company have observations been made, except at Fort Salisbury, and even there the records have been kept in a very irregular manner. Father Hartmann, however, Roman Catholic priest at Fort Salisbury, supplied Dr. Rayner with information regarding the daily temperatures, rainfall, etc., which, supplemented by his own observations, enabled him to form a very fair estimate of the climatic conditions of the plateau of Mashonaland. The highest temperature Dr. Rayner experienced was 91° F.: the minimum in September 1891 was generally about 60° F. The climate in October is probably very similar to that of September, but there are more cloudy days and some rain. Fort Tuli, which lies less than two degrees north of the Tropic, and the low country south of Fort Victoria are probably somewhat warmer than the plateau. Between July 4th and 17th the highest temperature recorded was 83°, and the lowest 42°, the mean temperature on the same days being 76° and 54° respectively. During the winter months the thermometer occasionally sinks very low at night, and once in a camp near the Lunde it fell to 32·5° F., while the maximum on the following day was 79°, the difference being, therefore, nearly 47°. Hoar-frost was once observed near Fort Charter at an elevation of 3000 feet above sea-level. The air on the plateau is very bracing, and there is invariably a cool easterly breeze. As regards humidity, it was observed at Fort Salisbury that the difference between the wet and dry bulbs increased as the day advanced, until during the hottest part of the afternoon it had often reached 20°, the relative humidity being from 23 to 30. Hence during the months of fine weather there is frequently no dew at all, and heavy dew is quite exceptional.

Father Hartmann's observations of temperature extended from February to August 1891, and show the maxima and minima recorded each month at 8 A.M., and also the relative humidity at the same hour. The observer was away during May and June; but Major Forbes, of the British South Africa Police, to a certain extent filled up the gap by giving Dr. Rayner the mean maxima and minima. The former ranged from 74° in August to 79° in April, and the latter from 43° in June and July to 62·5° in February. Hence it will be seen that July is the coolest of the winter months. Of the summer months, September and October, which do not appear in Dr. Rayner's table, are the hottest. The summer, from November to March, is comparatively cool, owing to the rains from the east coast.

The total rainfall of the season 1890-91, from October to April, was 48·31 inches, and the rainy days were 93. The wettest month was February, when 12·74 inches fell. The greatest quantity measured in one day was 3·37 inches, in March, and on two occasions an inch of rain fell in half-an-hour. The showers are very heavy, and are often localised; violent thunderstorms also occasionally occur. The directions of the prevailing winds are NE. and SE., but during the rains the wind

is shifty, and in winter sometimes blows from the west. Dust-storms and haze are unknown.

Emin Pasha and Dr. Stuhlmann.—A letter from Dr. Stuhlmann is published in *Petermann's Mitt.*, Bd. 38, No. 6, in which a preliminary description is given of the country between the Kagera and the lakes Albert Edward and Albert. From a place named Karo Dr. Stuhlmann saw a chain of snowy mountains to the north, which the natives called Gularo, and was probably Ruwenzori. In a broad valley on the frontier of Ruanda a small lake was passed. Then mountains 6500 feet high were crossed, and at Kyenkezi the Albert Edward Lake came into sight. Three days' march in a north-westerly direction brought the expedition to the Ruchurru, a river 50 yards broad, which flows out of a wide grassy valley into the lake. At the southern end of the lake the country is flat savanna, being, as the presence of half-fossilised fresh-water shells and the statements of the natives testify, a dried-up lake-bed. The most southern point of the lake lies in lat. 45′ S., but seems to vary greatly with the rainfall of the year. Vichumbi, at the south-western extremity of the lake, is a centre of trade between Usongora and Ruanda, and contains about 2000 inhabitants. From this point two plains stretch out southwards, the western watered by the Ruanda river, and the other by the Ruchurru. The eastern plain is the larger, and is bounded by the high ranges of Butumbi, Mpimbi, and Mpororo on the east, and on the south by level highlands from which rise steep isolated cones, the most eastern being called by the people of Uganda and Karagwe Mfumbiro. They lie in a line running from ENE. to WSW., and at the first glance are seen to be volcanic. Mfumbiro is a broad, lofty cone with furrowed flanks and a flattened summit—probably a crater. Its height was estimated on a later occasion at 11,500 feet. The highest of the group is probably over 13,000 feet, and another, according to the unanimous assertions of the natives, is still active. Passing round the southern end of the lake, the expedition skirted its western shore, partly in boats, where the mountains (5000 feet high) sank precipitously into the water; and then, striking in a north-easterly direction, crossed the Issango, which was at that point 60 yards broad and 2 to 3 feet deep. From Karewia an ascent of the Ruwenzori range was made, and an elevation of 13,000 or 13,500 feet attained. Marching northwards, Emin Pasha and Dr. Stuhlmann crossed the Issango-Semliki somewhat to the north of Stanley's point, and set up a camp at Undussuma, where they entered into communication with the Sudanese settled on the lake between Kavalli's and Mpiga's. After Emin Pasha's withdrawal his province fell into complete anarchy. Fadl el Mulla Aga secretly called in the Mahdists, whereon the soldiers revolted, and many of them joined Selim Bey at Kavalli's. On the departure of Emin's party 182 of these men followed it. Through country inhabited by Wavira and dwarfs they came to the Ituri, which flows southwards along the parallel of 30° E. long. Hordes of Manyema sent out by the Arab Selim ben Abed of Nyangwe devastate the land with their slave-hunting raids. The expedition traversed the Lendu plateau, 4000 to 5000 feet high, and reached the boundary of the Momfu country in 2° 13′ N. lat., where it was obliged to turn back, the country being laid waste by Manyema, and no supplies being therefore procurable. The sources of the Ituri Dr. Stuhlmann places at about 2° 40′ N. lat. and 30° 20′ E. long., and those of the Bomokandi a little further to the north. Small-pox having broken out among the party, it was thought advisable that Dr. Stuhlmann should march in advance with the able-bodied men. Accordingly, he proceeded as far as the Kinyawanga district, where he formed a camp in lat. 27′ 40″, and waited for Emin Pasha until January 15th, when he marched on to Bukoba. It is satisfactory to

learn from the *Mouvement Géogr.* that Emin has reached Bukoba quite recovered from his illness.

The Transvaal Railways.—This year is an important epoch in the history of the Transvaal on account of the introduction of railways into this country, which will contribute greatly to the development of its vast resources. Before the end of the year, Johannesburg, the chief mining centre, will be in direct communication with Cape Town and Port Elizabeth, and two or three months later Pretoria will be connected with the lines of Cape Colony. Work was recommenced in May on the Delagoa Bay railway, which is to be extended from Komatie Poort to Leydsdorp, the principal town of the Salati gold-fields, in the district of Zoutpansberg. The length of this line will be about 200 miles, according to *l'Afrique*, No. 6. The country is said to be very flat and to present no engineering difficulties. Half the section is to be completed by the end of the year.

Rainfall in German South-west Africa.—In the *Mitt. aus den Deutschen Schutzgebieten*, Bd. v. Heft 2, a table of observations at Tsaobis, Windhoek, and Rehoboth, forwarded by Captain von François, is published. At Tsaobis the total rainfall was 4·19 inches in 1890 and only 2·89 in 1891, the number of rainy days being twenty-nine and thirty-one respectively. The wettest month in the former year was March, when more than 80 per cent. of the total fall was registered, while in 1891 November was the rainiest month. At Rehoboth 9·75 inches fell in 1891 on fifty-one days, and at Windhoek 13·79 on seventy-four days. From these figures it will be seen that the rainfall increases towards the interior, and is particularly large among the mountains, as at Windhoek. In this place snow occasionally falls during the dry season.

British East Africa.—The harbour of Kismayu with its environs having been ceded by the Sultan of Zanzibar to the British East Africa Company, the latter now holds 750,000 square miles of coast lands, extending from the Umbe to the Juba river. Of porters there is no scarcity, for the natives of Taïta volunteer their services, and even the Masai seek the friendship of the Company, and have undertaken to maintain postal communication between the coast and Uganda. The telegraph from Mombasa through Melindi to Marereni has been completed, a length of 118 miles. Eight miles of railway have been laid down, but the construction is stopped for the present. A steamer for the Victoria Nyanza is ready, but cannot be transported to the lake, the cost being too high.

The Sahara.—M. F. Foureau, charged by the Ministry of Public Instruction with a mission to the Sahara, has returned from a preliminary journey. Leaving Biskra in January last, he travelled rapidly to Hassi-bel-Haïrane, whence he marched straight to Muila-Matullah, along a succession of large *gassis* (bands of firm ground amidst the sand-dunes), keeping a little to the east of Captain Bernard's route. Muila-Matullah lies in a sandy hollow, where water is found two feet below the surface. Then, crossing several chains of dunes, M. Foureau followed an eastward course and came to the southern edge of the Erg. Here and all along the road to Ghadames the sandy hills are based on lofty calcareous rocks. After surveying several of the spurs of these elevations, the traveller ascended the course of the Wadi In-aramas, across the rocky plateau of Tinghert, as far as the wells of Tabankort, and then, turning towards the south-west and following a number of ravines, crossed the arid mountain mass which overlooks Temassinin, and descended into the depression, El-Jua, where stands this little garden of two or three hundred palms. Since Flatters' expeditions no European has visited

Temassinin and Messegguem. Across the immense plain, which was once the bed of the Igharghar, the mission proceeded to El-Biodh, where around the wells were found the date-palms sown by Colonel Flatters. Before reaching Messegguem the Wadi Aullaga had to be crossed. It lies in the midst of a number of small dunes, covered with tamarisk and other shrubs. Hassi Messegguem is dominated on the north by the skirts of the Tademait: its water is excellent and abundant. On his return M. Foureau traversed the Erg from south to north by the *gassi* Ulad-Mokran, and reached Tuggurt on March 26. He has determined forty-one latitudes and longitudes, has observed the temperature and depth of several wells, and taken a compass survey of his route.—*Compte Rendu*, Nos. 9 and 10.

AMERICA.

The Yukon River.—In *Petermann's Mitt.*, Bd. 38, No. 6, Herr A. Lindenkohl, of the U.S. Coast and Geodetic Survey, summarises the results of the observations of Messrs. M'Grath and Turner, who spent two years in Alaska, from the summer of 1889 to that of 1891. They were sent out by the Coast Survey to determine the points where the meridian of 141° W. long., the western boundary of the British possessions, cuts the Yukon and Porcupine rivers. A great obstacle to the development of trade on the Lower Yukon is the shallowness of its numerous mouths, which are spread over 50 miles of coast. At present all goods destined for the Yukon have to be transhipped at St. Michael, and transported in boats of light draught to the most northern, the Aphoon, mouth of the river. The natives of the delta are among the most degraded of Alaskan Indians. During the spring floods they take refuge in their boats, returning as soon as the waters recede to their wretched huts, which never get thoroughly dry the whole year through. Partly owing to the unhealthiness of their abodes, and also, perhaps, in consequence of a diet almost exclusively of fish, they are subject to loathsome skin diseases. In spring the Lower Yukon swarms with innumerable geese, swans, and ducks, and both birds and eggs are sold at ridiculously low prices. The banks of the Upper Yukon are thickly clothed with firs, birches, and aspens, and in summer flowers blossom in all parts of the country, which contains much charming scenery, and is enlivened by birds and insects. The settlements are few; above Fort Yukon the only permanent habitations are at the mouth of Forty Mile Creek and on the site of the abandoned Fort Selkirk. Formerly this country yielded a large supply of furs to the Hudson Bay Company, but of late years comparatively few animals have been shot. It is not, however, its wealth in fish, birds, and fur-bearing animals which now attracts Americans to this region, but the thirst for gold. Traces of gold are found nearly all over Alaska, but seldom in quantities sufficient to reward the miner. The most successful gold-washings are on Forty Mile Creek, whence one firm drew last year gold to the value of £10,000, which was estimated to be less than the half of the total yield of the district. The industry suffers at present from the disadvantage that the miner can only work three months in the year, for he dare not for any consideration miss the steamer which is to take him home, and arrives at very uncertain dates. In this inhospitable land, and among the improvident natives, the stranger runs a risk of starving in winter.

The Indian tribes dwelling on the Upper Yukon have a common language, which is spoken from Senati village to La Pierre's House, on the Porcupine. This language is said to be very rich in words and to have great power of expression. The chief sustenance of the Indians is fish and reindeer meat; wild rhubarb and a root resembling liquorice supply them with vegetable food, and in autumn

bilberries, raspberries, and currants can be gathered in abundance. Salt is never eaten, and scurvy is unknown. The most common disease is an affection of the lungs, by which apparently strong people are suddenly attacked. Sick persons receive very little attention from their friends; indeed, the Indians display no attachment to their relations, except, perhaps, their children. Parents, brothers, and wives are often put to death with clubs as soon as they fall ill, and cannibalism is by no means rare.

Mr. Turner spent the winter of 1890 in a wooded valley on the Porcupine river near the boundary line, while Mr. M'Grath passed two winters on the Yukon, at Davidson Camp, as he named it. In the first winter the thermometer fell to − 59° F., and in the second to − 61°; during January and February 1890 it never rose above − 54°. Yet the members of the expedition did not feel the cold very intense, probably because they consumed a large quantity of fat, especially lard.

On March 27th, 1890, Mr. Turner started on a journey along the frontier line to the Arctic Ocean. The expedition, consisting of seven men and four sleighs, covered six miles the first day, and encamped in a grove of firs. The next morning the windings of the Sunaghun river were followed, and then an ascent was made to Boundary Rock, so named from its proximity to the frontier. From its summit, 2600 feet above sea-level, a fine view was obtained of the windings of the Porcupine river eastwards and of a short bold range westwards. The following day a height of 2490 feet was attained, where towards the east an immense valley could be seen losing itself in the distance. On the west this valley was bounded by a plateau, doubtless a continuation of the ramparts of the Porcupine. At a distance of 50 miles a low chain was visible, which afterwards proved to be the watershed of this part of Alaska. The valley was an oasis in the midst of desolation, being clothed with firs, birches, and poplars. It took three days to cross it. Countless lakes were then passed, and on the fifth day after leaving the camp the mountains were crossed by a pass 2950 feet high. The northern slope is much steeper than the southern, and the temperature was much lower on this side (− 20° to − 54° F.). The route descended into a valley, dominated by bold peaks 6000 to 8000 feet high. Here three streams meet, and their united waters find their way into the Arctic Ocean. Though the season was far advanced when the party reached the coast (on April 8th), there was no sign of thaw. The river was frozen to the bottom, and objects lying in its bed could be clearly seen through a layer of 10 feet of ice.

In the spring of 1891 another expedition, under Mr. Frederick Schwatka, explored portions of the Yukon basin to the north of Mount Elias. Mr. C. W. Hayes, who accompanied Mr. Schwatka as geologist, has given a full account of his observations in the *National Geographic Magazine*, May 15th. They ascended the Taku river by boat, reaching the head of navigation in eight days. Thence they crossed to the Ahklen lake, marching along the narrow valley of an eastern branch of the river, and then in broad valleys of the Upper Taku, 3500 to 5000 feet above sea-level. The last 15 miles out of the whole 85 lay in the densely wooded Ahklen valley among innumerable lakes and ponds. Setting up two portable canvas canoes brought from the coast, the party continued their journey down the lake and the Teslin river to the Lewes river, and to Selkirk at the confluence of the Lewes and Pelly. Hearing at Selkirk of a direct route overland to the White river, Messrs. Schwatka and Hayes started again on July 9th, turning toward the south-west over the great plateau which extends from the Yukon to the St. Elias mountains. The country around the White river is very scantily peopled, perhaps not more than 50 or 60 persons living in the whole basin. Several of the tributaries were too deep to ford, and the party had to ascend to the glaciers at

their sources. The divide between the White and Copper rivers was crossed by a pass covered with ice, and leading down to the Nizzenah, a tributary of the Chittenah, or eastern branch of the Copper river. Vegetation is here very luxuriant, and travelling is difficult through the dense woods. The stream is a continuous rapid till it joins the Chittenah, and for 7 miles above the confluence flows through a very narrow cañon with rocky walls 350 to 500 feet high. Forty miles' voyage on the Chittenah brought the party to the Copper river, and on August 12th Taral, a few miles below the confluence, was reached.

Newfoundland.—It appears that this island has many other valuable natural resources besides fisheries. The *Canadian Gazette* of July 16th, quoting from an official report, states that there are more than 2000 square miles of valuable timber lands, principally pine, within the colony; and now that the supply of wood in Canada has begun to fall off, owing to fires and indiscriminate cutting, Canadian lumber firms are turning their attention to Newfoundland. For mining industry there is immense scope. Ores of antimony, manganese, nickel, chromite, gold, silver, and other metals are known to exist, and there is abundance of various kinds of stone—marble, granite, serpentine, fluor-spar, mica, etc. At St. George's Bay, where it had been believed that no coal could be worked profitably, a very valuable seam was discovered in 1890. Sir William Dawson, Principal of M'Gill University, expressed his opinion that the coal was similar to that of eastern Cape Breton, with which the beds may be connected under the sea. Subsequent investigation has brought to light 27 feet of this coal, and its analysis gives a percentage of carbon not inferior to that of Cape Breton coal.

Death Valley, California.—Of all the valleys lying on the northern margin of the Mohave Desert this is the most remarkable, because of its great depth—its bottom descending, it is said, below sea-level. On the east it is bounded by the Funeral and Amargosa ranges, and on the west by the Panamint mountains. The former reach an elevation of 5000 to 6000 feet, and the latter rise to 8000 or 9000 feet, culminating in Telescope Peak, said to be 10,938 feet high. The valley is an independent drainage basin, nearly closed on the south by a rapidly rising ridge about 2000 feet high. The level southern part of the basin, which receives the waters of the Amargosa River, bears strictly the name of Death Valley. The gradually rising northern arm, 50 miles long, appears on maps as Lost Valley, but is usually known as Mesquite Valley. The length of Death Valley is about 75 miles, and its breadth nowhere exceeds 12 to 15 miles. In 1891 an exploration of the valley was made under the direction of Dr. C. Hart Merriman, and the meteorological information then obtained has been published by the U.S. Weather Bureau in a pamphlet entitled *Notes on the Climate and Meteorology of Death Valley, California*, by Mark W. Harrington. The bottom of the valley is the bed of a former lake of bitter water. Along the eastern side runs a glistening artery of white salt with borax deposits. The Amargosa river rises in Nevada, and has a course of about 100 miles, but it is nearly always dry where it enters the valley. Furnace Creek, which emerges from a cañon in the Funeral Mountains, derives its waters from numerous warm springs, one of them having a temperature of 90° F. The salt marsh is destitute of vegetation; in other parts grow a few shrubs and cacti and clumps of *mesquite* (American oak). Of animal life there is little variety; horned toads, lizards, and snakes are the most conspicuous forms. The depth of the valley has been estimated at 100 or 175 feet below sea-level. The topographer who accompanied the expedition will, no doubt, give some information on this point in his report. Barometric observations are very

unreliable for determining elevation under the peculiar conditions of pressure prevailing here. Nor are they true indications of the weather. Rain, which alone affects the humidity, generally comes with a high barometer, so that there occurs the curious phenomenon of greatest relative humidity with maximum pressure. The principal features in Death Valley are its excessive heat and dryness. The temperature in the shade rises occasionally to 122°, rarely falls in the five hot months below 70°, and averages 94°. The air is usually in active motion, and gales are very common, sometimes producing sand-storms. Rain falls frequently in the mountains and occasionally in the valley, and water may be found at the depth of a few feet; yet the heat and wind together keep the surface very dry and the relative humidity of the atmosphere very low. This state is due in great measure to the character of the valley. It is narrow and deep, and the white and shifting sands become heated by the noonday sun. The prevailing winds blow up and down the valley. The range of temperature is very great, and the diurnal change of the barometer is of the purest single-maximum type, and has the largest amplitude known. Those who have passed the winter in Death Valley speak favourably of its healthiness. The winter mean temperature is probably between 35° and 40°, and that of the year 58° or 60°.

OCEANIA.

New Guinea.—Dr. Montague, residing at Barpiloninka, on the Morehead River, about thirty miles east of the Dutch frontier, was in April 1891 carried off by a band of Tugeri, and conveyed a distance of fifty miles into Dutch territory. He spent three months among these savages, always on the watch for an opportunity of escape, and was eventually released by the natives on his representing to them the danger of drawing upon themselves the vengeance of Europeans. Not finding a ship, as he had hoped, at the Durga Strait, which separates Frederik Hendrik Island from the mainland, Dr. Montague was obliged to travel on foot the whole way to Sileraka on the Anglo-Dutch frontier. Here the natives built him a hut, in which he lived, teaching the people around, until he was rescued by the Dutch. Such is the account given in several periodicals; but the story must be received with caution until confirmed. There is some truth in it, without doubt, for the agent of the Koninklijke Paketvaart-Maatschappij, to which the steamer belongs which rescued Dr. Montague, has sent the report of the traveller to the *Tijdschrift* of the Dutch Geogr. Soc. One thing, among others that excite suspicion, is that this Dr. Montague calls himself a missionary, whereas we have heard from very good authority that there is no one of that name in New Guinea connected with a missionary society.

The Aphanapteryx in the Chatham Islands.—The Christchurch *Press* reports the discovery of a species of this bird by Mr. H. O. Forbes. In January last a gentleman from the Chatham Islands offered Mr. Forbes some curiosities for the Canterbury Museum, among which were some birds' crania and other bones. Mr. Forbes was at once struck by the resemblance to the rail of Mauritius. This bird, a contemporary of the dodo, was named *Aphanapteryx* by Frauenfeld, who discovered in 1868 a Dutch painting of the two birds in the private library of the late Emperor of Austria. The *Aphanapteryx* is remarkable for its long pointed and arched beak: it had a uniform reddish plumage, very rudimentary wings, and thick legs. Its habitat was unknown, until two leg-bones and a portion of the lower jaw of a bird were found in the Cambridge Museum, which undoubtedly had belonged to a bird such as was depicted in the Dutch painting. Mr. Forbes made a journey to the Chatham Islands for the purpose of obtaining additional evidence,

and returned with the conviction that a similar bird had formerly existed there, but of rather larger size than the Mauritius variety. He therefore named it *Aphanapteryx Hawkinsi*, in honour of the gentleman who brought over the first bones. This discovery is of great interest as bearing on the question of the former existence of an Antarctic continent, to which the presence of opossums in South America seems likewise to point. The great objection to this supposition of a land connection between Australia, South America, and South Africa is that no forms of the latter continents have been found in Australia or New Zealand. This Chatham Island form is the first instance of remains of a flightless genus of birds hitherto confined to the African regions being found in Australasia.

The Cook Islands.—The seven islands of which this archipelago is composed are scattered over an ocean-area of 180 square miles. Though small, they are very fertile, and enjoy a pleasant and healthy climate. Mr. F. J. Moss, British Resident at Rarotonga (*Colonies and India*, April 16) considers that their chief value lies in their position at the gateway of the extensive and beautiful archipelagos in the Eastern Pacific. The annual export from the Cook Islands is valued at £48,236, over £30,000 of this trade being with New Zealand, and the remainder with California through Tahiti. The quantity of cotton and *copra* exported has diminished, while coffee has rapidly advanced, the quantity exported in 1891 being 270,000 pounds. No care is taken with the plants, and, if properly attended to, this product might be made of much more importance than it is at present. The export of oranges, limejuice, and coco-nuts should also increase. The arrowroot, citron peel, etc., of the Cook Islands are of the finest quality, but small in quantity. Considerable tracts of waste land of great fertility are available for settlement. Mr. Moss believes that Japanese Christians would be the best immigrants.

South Pacific.—Mr. Josiah Livingstone has kindly communicated to us a few observations made by Captain Steele, of the Chilian steamer *Guayacan*, on dangers to navigation in the South Pacific. On Feb. 20, 1891, Captain Steele, being unable to sail along the Chilian coast because of the revolution, left Valparaiso for Newcastle, New South Wales. This voyage is seldom made, and, therefore, errors in the charts may long escape correction. Captain Steele drew up a full report to be forwarded to this Society. Fortunately for himself, as it afterwards proved, he was compelled by ill-health to leave his ship at Bombay, and his papers remained in the cabin of the vessel, which is believed to have gone down in the recent cyclone at Mauritius. Of Oeno shoal Captain Steele says:—"A few days before leaving Valparaiso I met the master of a Chilian coaster, a German, who had made this passage, and, speaking of the islands, he said, 'Look out for Oeno shoal. I believe it is wrongly laid down on the chart.' He had almost lost his ship on it one bright forenoon, but had not had the curiosity to know what his position was. On March 11 our latitude was 23° 59½′ S. and long. 129° 52′ W., when Oeno shoal, according to the *Directory*, would lie at a distance of 41 miles in a direction S. 87° W. (The Admiralty *Sailing Directions* give its position as lat. 24° 1′ S., and long. 130° 41′ W.) Until 6.30 P.M. the course steered was S. 86° W., and the distance run from noon was 45 miles. I was aloft from 5.30 to 6.30 P.M., but saw nothing of the shoal. We then steered S. by W. until 8.30 P.M. Should the latitude of this reef be given incorrectly, as that of l'Esperance rock certainly is, the danger to shipping must be very great." On March 16 Rapa Island was sighted. According to Captain Steele's calculations, it lies six miles further westward than as represented on the charts. Large quantities of sea-weed were passed during the two days before the island was sighted, but none was seen to windward of it. Rapa, with its group of lofty peaks, has an imposing appearance. L'Esperance rock, which

has the outline of a low saddle, was sighted on March 27. Suspecting from an ex-meridian altitude of the sun that there was something wrong in the latitude of the island, Captain Steele gave orders to two officers to take meridian altitudes, with the result that the island was shown to be $7\frac{3}{4}$ miles to the north of its position on the chart. It was also proved that it is placed too far west on the chart; in short, its true position is $9\frac{1}{4}$ miles N. 34° E. of its given position. Captain Steele points out the serious danger attending such an error in latitude, mistakes being unexpected in this co-ordinate, while longitude is less easily determined and more liable to error. "I may state here," Captain Steele writes, "that I had known the chronometer I was using for a long time, and could thoroughly rely on it and the *rate*; also that on arrival at Sydney I found the rating perfectly correct."

The remaining danger to be recorded lies in another part of the world—off the coast of Madagascar. On July 27, during a run from Mahela on the east to Tullear on the west coast, when within sight of Machikora, Captain Steele had no sooner gone below, at 4 A.M., than he heard the ship grating over something with a sort of crunching sound, and before he could reach the deck this sound was repeated. "About a mile to the eastward," to quote Captain Steele's own words, "I could see several small black rocks just above water, and to WSW. the sea was rolling from the east over what was evidently a coral reef, or rather patch. It was spring tide, and dead low-water at 4.30 A.M., at which time we were at least eight miles from the coast. Had we passed at high-water, the ship would not have touched where she did, but, on the other hand, might have been caught by the rocks to the east. I make the position of this danger lat. 25° $6\frac{1}{2}'$ S. and long. 44° 1′ E."

MISCELLANEOUS.

Colonel W. H. Gilder intends to fit out an expedition in America to ascertain the exact position of the **North Magnetic Pole.**—*Deutsche Rundschau*, Jahrg. xiv. Heft 10.

A census has been taken of the population of **Basuto Land.** It is now 218,902, of which 218,324 are Basutos. In 1875 there were only 175,000 natives in this territory.

Six thousand miners are at work on the **gold-fields of Demerara**, and the *Orinoco* has brought home 8000 ounces of gold, the output of three weeks.—*Colonies and India*, July 2d.

The total **production of iron** in the world during the year 1891 was about 24,567,000, of which the United States contributed 8,145,000, Great Britain 7,115,000, Germany 4,382,000, and France 1,889,000.—*Geografia per Tutti*, June 15.

The Prussian Parliament has granted the sum required for the establishment of a **biological station in Helgoland.** Dr. Friedrich Heincke of Oldenburg will be the director, and will be assisted by Dr. C. Hartlaub of Bremen and Dr. Ehrenbaum of Hamburg.—*Geogr. Blätter*, Bd. xv. Heft 2.

The German and Austrian Alpine Club, which has already established **meteorological stations** on several heights, as on the Hochobir in Carinthia and the Sonnenblick near Gastein, has decided to construct one on the Brocken, 3746 feet high, the greatest elevation in North Germany.—*Globus*, Bd. LXII., No. 2.

The project of a **Perekop Canal** is now under discussion. A waterway between the Sea of Azov and the Gulf of Perekop would considerably shorten the distance between ports on the former sea and Odessa, and would have a great effect on the coal-trade of the Donetz basin.—*Deutsche Rundschau*, Jahrg. xiv. Heft 10.

Neptunia, May 1892, reports a singular phenomenon from the Balearic Isles. On March 4, about nine o'clock in the morning, a violent wind from the north blew over Soller in Majorca. As the wind died away, the rain by which it was accompanied increased, and at the same time the ground was covered by a yellowish coating, which proved to be **sulphur**.

This summer an expedition is to be sent to the **southern extremity of America**. The funds have been subscribed by several scientific societies and by private persons in Hamburg. Dr. Wilhelm Michaelsen, the leader, will turn his attention chiefly to *Plankton* and the lower forms of fresh-water fauna, though he will not neglect the deep-sea fauna of high latitudes. *Geogr. Blätter*, Bd. xv. Heft 2.

A bottle thrown by Mr. T. M. Follow into the sea at Redcar, Yorkshire, on October 8th, was picked up on April 12th off Hjelms Oe, at the extreme north of Norway, having accomplished a voyage of 1390 miles in the six months. The existence is thus confirmed of a **current in the North Sea**, which, setting at first south-eastwards, afterwards turns to the north along the coast of Norway.—*Nouvelles Géogr.*, No. 7.

During the last four years a new town, **Russian Bokhara**, has sprung up at a distance of 8 miles from the old capital of the Emir. Russians and other Europeans had to live in the narrowest and dirtiest quarters of the old town until, urged by the political agent, M. Lessar, the Emir granted a site for a new town at a distance of two miles from the station of the Trans-Caspian railway. An excellent road has been constructed from the station to the capital.

An **island** has been raised by volcanic energy in the **Caspian Sea** near Baku. On the 9th of May measurements were taken, and the island was found to be of elliptical form, its axis measuring 175 and 98 feet respectively. It rises 21 feet above the water, and its soil is composed of hardened clay, dark grey and yellow in colour. Three miles to the east of the island a funnel-shaped crater, 5 feet broad and 105 feet deep, has been formed just below the water, and from this a greyish fluid is ejected.

NEW BOOKS.

Persia and the Persian Question. By the Hon. GEORGE N. CURZON, M.P. 2 vols. London: Longmans, Green, and Co., 1892. Pp. xxiv + 639 and x + 653. *Price* £2, 2*s*.

This work, although it comprises a record of the writer's travels in Persia, is not simply, or even chiefly, a book of travels, but rather a comprehensive treatise on Persia socially, geographically, and above all politically. The scope of the work, which had its origin in the letters written by Mr. Curzon as special correspondent to the *Times* in 1889-90, is thus indicated in the preface :—

"In proportion as I advanced, so did the horizon of my task expand before me, until I realised that there was genuine and imperative need for a compendious work dealing with every aspect of public life in Persia, with its inhabitants, provinces, cities, lines of communication, antiquities, government, institutions, resources, trade, finance, policy, and present and future development—in a word, with all that has made or continues to make it a nation."

To the accomplishment of this task Mr. Curzon brought an open mind, a clear understanding, indomitable perseverance, and the grace of a vigorous literary style. Above all, he shows that he had the breadth of view and the appreciation of relative importance that distinguish the statesman from the mere politician.

Instead of attempting anything like a synopsis of these interesting volumes, which, large as they are, could not be abridged without loss, we shall give a better idea of the work (which we may say in a word is an admirable one) by placing before our readers the following analysis of its contents.

After an introductory chapter, Chapter II. is devoted to the various routes to Persia and an account of the ways and means of travelling when that country is reached. Chapter III. narrates the writer's journey from London *viâ* the Caucasus to Ashkabad on the Transcaspian railway. Chapter IV. gives a general account of the new Russian province of Transcaspia and a forecast of its future. Chaps. V., VI., and VII. narrate the journey from Ashkabad *viâ* Kuchan to Meshed, with a detailed description of the latter holy city and of the great natural fortress of Kelat-i-Nadiri. Chapter VIII. is devoted to the politics and commerce of Khorassan, and Chap. IX. to those of Seistan. Chapter X. resumes the personal narrative, and gives an account of the writer's journey from Meshed to the capital, Teheran, a description of which city is given in Chapter XI. Chapter XII. is devoted to the provinces of Ghilan, Mazanderan, and Astrabad, lying along the shores of the Caspian. Chapter XIII. is devoted to the present royal family and principal ministers of state, Chap. XIV. to the system of government, and Chapter XV. to institutions and recent reforms. Chapter XVI. treats of the north-western provinces of Azerbaijan, Kurdistan, etc., and Chapter XVII. of the army. Chapter XVIII., which completes the first volume, goes minutely into the question of railways, and recounts the various futile concessions that have been granted during the last twenty years.

In the second volume, Chaps. XIX. to XXII. narrate the journey from Teheran to Bushire, with a description of the towns of Ispahan, Shiraz, and Bushire, and of the ruins of Istakhr, Persepolis, and Shapur. Chap. XXIII. is devoted to the south-eastern provinces, Chap. XXIV. to the south-western, and Chap. XXV. to the river Karun. Chap. XXVI. gives an account of the very unimportant and almost non-existent Persian navy, Chapter XXVII. being devoted to the geography, history, and politics of the Persian Gulf. Chaps. XXVIII. to XXX., with which the volume concludes, are among the most interesting in the whole work, treating as they do of the revenue, resources, and manufactures, of the foreign trade past and present, and of the British and Russian policy in Persia.

Great care and much labour have been bestowed by Mr. Curzon on the preparation of the excellent large general map of Persia, and of the smaller ones of particular routes on a larger scale which illustrate the text. Altogether the work forms a compendious and trustworthy text-book on Persia and the Persian question.

A minor matter requires notice, one concerning the publishers rather than the author, viz., the unwieldy form in which the two volumes appear. They are too heavy to hold in the hand, and are uncomfortable to read even on a table, owing to their great thickness and the narrowness of the inner margin, which obscures the ends of the lines.

Imperial Federation. The Problem of National Unity. By GEORGE R. PARKIN, M.A. With Map. London: Macmillan and Co., 1892. Pp. 314. *Price* 4*s.* 6*d.*

Mr. Parkin has been well advised in publishing this lucid and rational view of what is claimed by the supporters of Imperial Federation. Hitherto the public have had to be contented with platform utterances on this great national question; and it must be confessed that oratory of that kind has been more conspicuous for

rhetoric than for reason: hence the whole question has fallen into disrepute. Mr. Parkin has, however, in the book before us, given what may be regarded as the official programme. He discusses Imperial Federation with singular moderation and reserve, except in one respect, to which we shall allude. His appeal is directed, not to the opportunists, but to the citizens of the greatest Empire the world has known. Such an appeal cannot fail to have an effect on all those whose minds are not limited to parochial interests or cramped by ignorance of the great resources and the boundless possibilities of the British Empire. The supporters of Imperial Federation are indeed fortunate in having secured the services of Mr. Parkin, who has devoted some years of his life and directed his best energies towards the realisation of British national unity. His views are sound and his power of literary expression conspicuous.

The only point on which we disagree with Mr. Parkin is in pushing his argument for national unity to the extreme of representative government by a common Imperial Parliament or Council. Mr. Parkin's views in this respect may be briefly given as under:—

"For the Mother-land an organised national unity means, not degradation from her imperial position, but a frank acceptance of the facts of national growth, and the greater dignity which would come from acknowledged leadership of the free communities which have grown up around her.

"Prussia gained, instead of losing, in dignity, when many of the higher functions of her historic parliament became merged in those of the Reichstag of the German people, when she gave up her individual place as a nation in Europe to assume the leadership of the German Empire. So would it be with Great Britain" (page 27).

And again, on page 304:—

"The realisation of some such an ideal as this—a common representative body, Parliament or Council, directing the common policy of the Empire, while absolute independence of local government is secured for the various members—may fairly be looked upon as the only ultimate alternative to national disintegration, the only thing which can fully satisfy our Anglo-Saxon instincts of self-government, and give finality to our political system."

With this view we wholly disagree, and that for reasons which were given at length in the papers which we published in this *Magazine* on *Britannic Confederation*, more especially by the late Professor Freeman and Lord Thring. The German Empire is not in any way comparable to the British Empire, nor, for that matter, are the United States—as quoted by Mr. Parkin on page 33. If Mr. Parkin is consistent, he advocates nothing less than the disintegration of the whole fabric of the Empire *before* consolidation becomes possible, instead of the historic and more natural method of national growth and development. Perhaps, by observing the principles of national development and expansion, it may come to this in the end, after the great Colonies have themselves become great nations; but as yet, individually or in conjunction, they cannot expect to take equal rank with the Mother-country. Their promise and their power, however great, cannot be regarded as a set-off against the vested interests and the responsibilities of the United Kingdom. Neither Canada nor Australia could stand alone, except by the forbearance of their rivals, on which they could not always count. Canada, however, is loyal, and the most advanced in national development; from her must come the first decision as to unity with the Mother-country.

Mr. Parkin's book would have gained in literary value and in proportion had the chapters on the ephemeral views of Mr. Goldwin Smith and Mr. Carnegie been omitted and more space given to India and to the discussion of the relations between the minor colonies, dependencies, etc., and the Mother-country. We note

two slight errata—Austro-Hungary for Austria-Hungary (p. 279), and institution for constitution (page 303). There is no index to the book, which is to be regretted.

Rulers of India: Mount-Stuart Elphinstone. By J. S. Cotton, M.A. Oxford: At the Clarendon Press, 1892. Pp. 222. *Price* 2*s.* 6*d.*

Mr. Cotton has treated the character and career of Elphinstone in a sympathetic spirit and with marked ability, evidently feeling himself, and succeeding in conveying to the reader, the attractiveness and charm of his healthy, many-sided and well-balanced nature. Forgetful of self, thoughtful for others, and devoting his best energies to promote the welfare of the people among whom he served—a lover of literature, with a keen interest in things intellectual, a hard student and an omnivorous reader, yet a thoroughly apt and clear-headed man of business, with shrewd insight into character, fond of society and of active outdoor exercise and sport, winning the admiration of Arthur Wellesley by his conduct on the battle-field, preserving coolness and the command of all his powers when suddenly confronted with the treachery of the Peshwa, and then administering the conquered territories so as to become the object of the warmest regard, Elphinstone presented a combination of qualities which admirably fitted him for his work in India, and which is less likely now to be found in the members of a civil service which is recruited by a system of competitive examination that tests only one kind of ability. It is not however his character, admirable as it is, which entitles him to a place in the series devoted to Rulers in India, but the part he played in the events which followed the second and led up to the third Mahratta War, which broke the power of that people and made the British Government supreme in the Peninsula, and in the organisation and administration of the provinces that were then acquired. His was not the master mind which devised and directed the policy that resulted in the conquest. In carrying out this policy he was only an instrument, but an instrument trusted, capable, and self-reliant. It was when the time came for the organisation and settlement of the conquered territory that Elphinstone found his opportunity, and could show his powers and the spirit that animated him. Chapters ix. and x., which describe his policy, the arrangements which he introduced, and the aims which guided him in his administration of the Bombay Presidency, form the most valuable section of the memoir. Wisely omitting technical details which are of interest only to specialists and officials, Mr. Cotton has handled the subject so as to bring out prominently the broad general principles of Elphinstone's policy, and to enable any intelligent student of British administration in India to realise the importance of his work at the time, and the permanent value of his utterances with reference to the most delicate problems that call for a solution at the hands of the British Government. The book can be strongly recommended to the attention of every one interested in the administration of India.

The Story of Uganda and the Victoria Nyanza Mission. By Sarah Geraldina Stock. Map and 15 Illustrations. London: The Religious Tract Society. 1892. Pp. 223.

It is by no means an easy task to give a clear and succinct account of missionary enterprise in Uganda, Central Africa, and Miss Stock is to be congratulated upon the ability and accuracy with which she has accomplished her work.

It is now sixteen years since the Church Missionary Society decided to make a bold plunge into the centre of Africa, and few missionary enterprises have been attended by more thrilling adventures, greater loss of life, or more startling vicissitudes.

Whether it was altogether a wise thing to leave the base of operations and to put 600 or 700 miles of disturbed and savage country between the mission and the nearest station of the Society is a matter which fortunately we have not to decide. Caution would be against such a step, but it was a brilliant example of faith and courage. It is too soon yet to estimate results, but the present aspect of affairs is not promising.

For the details of this history we must refer our readers to Miss Stock's book itself, as quotation would spoil the interest of the reader, who will, probably, having once commenced the book, read on until it is finished. We may say however that the vacillating Mtesa, changing his religion with the year, is well described, the natives and the country are to all intents and purposes accurately depicted, and the difficulties and successes, the persecutions and the sorrows of the missionaries are graphically portrayed. Even readers of Mackay's life will not find his work discounted in this interesting narrative.

One thing this book brings prominently forward is the unhappy result of Protestant and Catholic missionaries working in the same country; we mean, of course, in such a country as Uganda. One cannot help feeling that for the sake of humanity such overlapping should be prohibited, as there seems to be little doubt that the presence of the French and British missionaries has really been the cause of all the bloodshed and misery which has occurred in Uganda during the past few years. Surely Africa is large enough to permit of any amount of missionary effort without one sect encroaching upon the sphere of influence of another, as the Catholics did in this case.

We heartily commend the book to our readers.

Ten Years' Digging in Egypt: 1881-1891. By W. M. Flinders Petrie. Religious Tract Society, 1892. Pp. 201. Index, Map, and 116 Illustrations.

This is a book of interest out of all proportion to its size. It contains the explorer's summing up, for popular purposes, and not in the form of reports, of the results of his ten years' work. That that work has been of importance will be admitted when we remember that it includes the discovery of the oldest dated building in Egypt and of masses of interesting and valuable papyri, and throws much light on the highly-developed architecture of the pre-pyramid period, on the origin of the Mediterranean alphabets, and on the practically unsuspected early civilisation of Europe. The story is well told, as it was well worth telling. The book is ghoulish often, and might be read in the dog-days for the sake of the shivers it occasionally raises. In the most matter-of-fact way Mr. Petrie says, "I stripped for the work, and for hours was occupied in opening coffin after coffin, carefully searching the dust inside each," and so forth, and it seems all right. We even sympathise with his indignation when he discovers that some scoundrels have rifled the tomb before him, and share his contempt for the unintelligible inscriptions on certain coffins, mostly sham copies of the usual formula, "put on by a decorator who could not read." But one is a trifle startled by the description of the "digging" of Horuta's half-inundated family vault, of the cutting of its heavy sarcophagus lid in two, and the raising of one piece, which proved to be the foot end; and of the day spent struggling with the inner coffins, sitting in the sarcophagus up to the nose in water, yet without being able to draw them out from under the rest of the stone lid; and of how "after some days the men raised that, enough to get one's head in between the under side of it and the water; and then I spent another gruesome day, sitting astride of the inner coffin, unable to turn my head under the lid without tasting the bitter brine in which I sat." However, Mr. Petrie by these and other means has gathered many treasures from

the far-off ages, from fire-drills to jewelled saws, and his discoveries have made the living world the richer, and should make it also humbler, by showing how many things have only been re-discovered.

History of Corea, Ancient and Modern. With Description of Manners and Customs, Language and Geography. By Rev. JOHN ROSS. London: Elliot Stock, 1891. Pp. xii + 404.

This is a cheaper edition of a work already known to those interested in the nations of the Far East. The first nine chapters are purely historical, the ninth, which brings the history down to our own times, having perhaps most interest for the general reader. The earlier chapters are not very pleasant or easy reading. They recount tales of fierce fighting between the various races inhabiting the north-western borders of China proper. All down the centuries it was an endless struggle for supremacy, the weak nation of one period rising in the course of a generation to the position of a strong military power, simply to give place in its turn to some other conquering hero. Purely personal ambition seems to have been the motive power in all these fightings. There is not much evidence of a truly patriotic spirit. Soldiers were simply robbers, who would turn their hand against their nearest neighbours if some military genius did not find scope for their talents further afield. The narrative is highly condensed, and at times almost confusing in its kaleidoscopic changes and multiplicity of names that never linger long enough to attain even a shadowy personality. And then the carnage is something frightful. The Chinese historians—are they quite guiltless of romancing?—think no battle worth recording in which the conquered do not leave their tens of thousands on the field. Interspersed with the rather weary record of marchings, counter-marchings, battles and sieges, we have every now and again interesting glimpses of Eastern life and diplomacy. Mr. Ross brings out very clearly the truth that it is the head which rules. The collapse of a once strong Power is almost invariably due to a foolish Rehoboam undoing the life-work of a father or grandfather. But in this connection we absolutely fail to understand the sentence (page 78): "It is difficult to harmonise history and Darwin." To our mind it is all the other way, being quite a good illustration of the perishing of the unfit. Our author evidently thinks that Darwinism means individual heredity!

Chapter X., on Korean Social Customs, is at once valuable and interesting. Particularly full is the description of funeral, burial, and mourning rites. The same chapter touches on educational methods, which are of course essentially Chinese. Chapter XI. gives a brief sketch of the religious beliefs of the Koreans, which are essentially Buddhistic. Chapter XII. is devoted to the Government, Chapter XIII. to the language, and Chapter XIV. to the geography of the country. Mr. Ross has a high opinion of the scientific value of the native Korean alphabet, a knowledge of which is invariably disclaimed by the cultured Korean, who reads and writes Chinese with ease. Half-an-hour's study is sufficient to master this alphabet, which is almost purely phonetic. But surely the curious, though regular, manner in which given consonantal signs have different sounds according to their position in a word or juxtaposition to other letters must take some little time to thoroughly master. A comparison is instituted between Korean and the neighbouring languages, Manchu, Mongolian, and Japanese. The last-named Mr. Ross has rather mutilated by his mode of transliteration; but the general linguistic conclusions are no doubt perfectly sound. The illustrations are quaint but faithful so far as costume is concerned. Their quaintness is sufficiently explained by the fact that they are the execution of a native artist.

The Ainu of Japan, etc. By the Rev. John Batchelor. London: Religious Tract Society, 1892. Pp. xiv + 287.

This book is to be commended in every aspect of it. It is written by the only European who has really lived and worked amongst the Ainu—probably the only European who has attained facility in the use of their language. Other missionaries of the Church Missionary Society have laboured amongst them; but none has devoted himself solely to this work as Mr. Batchelor has done. A perusal of Mr. Batchelor's interesting book impresses upon us the now recognised truth that mere travellers' tales about an alien race must be accepted with caution. Only after a lengthened sojourn in the midst of an untutored people can the stranger hope to get any insight into their deeper nature. The unwritten language must first be mastered—a task only possible to one who has the linguistic gift and a ready sympathy with men. Then gradually, by conversation, must the childlike mind of the savage be allowed to unfold itself. A very little may turn the whole community against the stranger. Mr. Batchelor, for example, once found a whole village set against him—an antipathy which he finally traced to the oldest woman resident there. She hated all foreigners, whether Japanese or European. Though the Ainu women have no rights, and are occasionally not even credited with immortal souls, the Ainu men stand in superstitious awe of them. An angry wife, we learn, is almost the worst evil a man can experience; and an old woman is greatly feared. Mr. Batchelor, however, bought over the octogenarian by judicious gifts of tobacco and sugar, and thereafter all was smooth. The most valuable chapters to the folk-lorist are those on Death and Burial, on Ghosts and the Future Life, and on Legends, both religious and heroic. These legends are full of the miraculous, as when an Ainu brings his brother to life again by cutting him twice or thrice with his sword. Then these ancients could fight in the air, and could "ride upon a sound like thunder." There is, however, a distinct touch of poetry in the phrase descriptive of dying: "She rode upon the setting sun." Remarkably interesting, also, are what might be called the Nine Articles of Ainu belief, as drawn up by Mr. Batchelor. They recognise one supreme God or Creator and an indefinite host of smaller deities, both good and bad; they believe in immortality both of man and beast, in three heavens above and six worlds beneath, and regard the ghosts of old women as very demons in nature. In ordinary life the Ainu are easy-tempered, mild, harmless, dirty, and drunken. They are fine horsemen, and think a bear-hunt, with its inevitable bacchanalian finish, the highest pleasure on earth. Once a much more widely distributed race, they have gradually been driven northwards out of the main island of Japan; and now in the island of Yezo they are steadily dying out in presence of the stronger Japanese race. They are doomed to a speedy extinction; and most fortunate from a scientific point of view has been Mr. Batchelor's devotion to them. He has rescued from oblivion a mass of legend and superstition which cannot but throw light on the habits of thought of primitive man. And all this is a direct result of the missionary spirit.

The book is remarkably well illustrated, partly from photographs and partly from drawings by Mrs. Batchelor. The articles of furniture are particularly interesting, such as spoons, moustache-lifters, the various parts of the loom, and so on. Of treasures and ornaments the chief are Japanese lacquer-ware, old swords, earrings, finger-rings, and necklaces. To have one's ears bored is the seal of brotherhood; and on one occasion Mr. Batchelor, after discoursing on the Christian ideal of universal brotherhood, had great difficulty in convincing his audience that it was not necessary for him to have his ears bored and a piece of red rag put

through. In their forms of salutations, in the arrangement of their house, in the allocation of place at a meal, in the manner of entering and leaving a hut, all is matter of the strictest etiquette. The modes of salutation, which are quite different for the two sexes, are very elaborate and long-drawn-out. The description of them in Mr. Batchelor's pages is made more lucid by pictorial illustration. Not the least interesting part of the book is the story of a bear-hunt as told by an Ainu ; but, indeed, every page is full of novelty and interest, and the book has only to be read to be duly appreciated.

Selections from the Records of the Madras Government: Memoir of the Survey of Travancore and Cochin, 1816-1820. By Lieutenant B. S. Ward. Madras Government Press, 1891.

Travancore and Cochin were surveyed more than seventy years ago by Lieutenants Ward and Conner (to whom the surveys of Malabar and Coorg were also due) ; and the results, consisting of seven parts which contain a journal, tables of triangulation and descriptions of the districts, villages, forests, productions, and passes, are to be found in three large folio manuscript volumes in the Geographical Department of the India Office. Five years ago, when the new survey of Travancore was set on foot, these manuscript volumes were lent to the Government of India ; and the opportunity has been taken at Madras to reprint the journal portion, which contains a descriptive account of Lieutenant Ward's journey from Madras *viâ* Pondicherry, Madura, Colachul, Trivandrum, the course of the Periyar river, Quilon, and Cochin to Trichoor. Considering how comparatively weak the *Imperial Gazetteer of India* is in respect of statistical information regarding native states, the present volume will be found useful from a geographical point of view. Some extracts of this work were published in the *Madras Journal of Literature and Science*, vol. i. pp. 1 and 54 ; but the journal *in extenso* is believed to be now printed for the first time.

Himalayan Journals ; or, Notes of a Naturalist in Bengal, the Sikkim and Nepal Himalayas, the Khasia Mountains, etc. By Sir Joseph Dalton Hooker, K.C.S.I., F.R.S. With Maps, etc. ("The Minerva Library of Famous Books.") London : Ward, Lock, Bowden, and Co., 1891. Pp. xxxi. + 574. *Price* 2*s.*

This great classic of naturalists has for a generation been out of the reach of the general reader. The original edition brings a fancy price. For what is, comparatively, a trifle, the publishers have now given us an even better book ; for this edition contains a memoir and a portrait of the distinguished author, and lacks not one feature of the first, except some of the appendices. It is difficult to believe that Sir Joseph Hooker went out to India in the suite of the new Governor-General, Lord Dalhousie, so long ago as 1847, and that the *savant* who was imprisoned along with Dr. Campbell, Superintendent of Darjeeling, by a faction of the Sikkim court, is still in our midst, the greatest botanist of whom England can boast, and long a member of the Institute of France. This work is as valuable a contribution to geography as to botany, and it should be in the hands of all who love both or find delight in works of travel. It is the thirty-second of the famous books which form the Minerva Library, as the work of its author's friend, Darwin's *Journal of the "Beagle,"* is the first. Mr. Murray has supplied copies of the many original woodcuts.

Lectures on Slavery and Serfdom in Europe. By W. R. Brownlow, M.A., Canon of Plymouth. London : Burns and Oates, Limited, 1892. Pp. xlviii + 248.

Canon Brownlow's book on *Slavery and Serfdom in Europe* consists of six lectures given at various times before the "Torquay Natural History Society."

The author confesses that he drew his inspiration from the learned works of M. Paul Allard, *Les Esclaves Chrétiens* (1876), and *Esclaves, Serfs, and Mainmortables.* He admits, indeed, that his first lecture is almost entirely an epitome of the first-mentioned work, which draws a terribly dark and dismal picture of Roman slavery under the Empire. The reading of that book impressed him with the sense of how great a debt the world owes to Christianity in the abolition of slavery. He therefore sets before himself the maintenance of the twofold theme, first, that the abolition of slavery has been in all cases due to Christianity; and, secondly, that the abolition of slavery by Christianity is a proof of the divine origin of the Christian religion. He is also animated with the very creditable hope that the same power that solved the gravest social problem of the past may be confidently trusted to lead the way in the solution of the social problem of the present and the future—namely, the problem of the relations of labour and capital. In pursuance of this idea, Canon Brownlow reviews in successive lectures the position of slaves in the Roman Empire, in Mediæval Europe, in the British Isles, and in the British Colonies. Two lectures are devoted to the abolition of serfdom in England and of slavery in Europe,—particularly in France, in Germany, and in Russia. Perhaps necessarily, the work is rather a compilation than an original treatise. Both the work of compilation and collection has been done intelligently and sympathetically. The author quotes largely from Bracton, from Seebohm, from Reeves, from Skene, from Wallace, and from other authorities, and his book contains a vast amount of interesting and useful matter. His general conclusion is that while Christianity prepared the way for, and accomplished, the deliverance of the slave, a variety of other causes effected the emancipation of the serf; and that the abolition of serfdom in Europe has by no means solved those great social problems on the solution of which depends the happiness of the human race.

To the Snows of Tibet through China. By A. E. Pratt, F.R.G.S. London: Longmans, Green, and Co., 1892. Pp. xviii. + 268. *Price* 18*s.*

Mr. Pratt left England in 1887 for China, where he stayed four years, ascending the Yang-tze-kiang, and travelling about the province of Sze-Chuen and into the borders of Tibet. At Ta-Tsien-Lu he met at different times Mr. Rockhill and Prince Henri d'Orléans and M. Bonvalot, on their way eastwards. The author is a naturalist, and the object of his journey was to collect specimens. The scientific results, however, are for the most part relegated to appendices, where lists of the species obtained, and descriptions of new varieties, are given by Dr. Albert Günther and Mr. J. H. Leech; and the non-scientific reader may therefore enjoy the descriptions of the country and incidents of travel uninterrupted by references to subjects he is unacquainted with. The style is occasionally faulty; but the author deserves great praise for adhering to the resolution announced in his preface of abstaining from generalisations based on limited experience. Though not unknown to Europeans, the region Mr. Pratt travelled in has rarely been visited by them. The numerous illustrations which adorn the book show that it contains much beautiful and striking scenery.

Voyage au Mont Ararat. Par Jules Leclercq. Paris: E. Plon, Nourrit et Cie, 1892. Pp. 328.

Two or three travellers have during the present century ascended Mount Ararat, but as many have been unsuccessful in reaching the summit. That M. Leclercq must be counted among the latter is not a consequence of any lack of energy and determination. In spite of a severe attack of mountain sickness, to which climbers seem to be peculiarly subject on this mountain, owing, no doubt,

to the sudden transition from the heated plains to a region of snow and ice, M. Leclercq had struggled bravely upwards to a height of 15,600 feet (about 1400 feet from the summit) when thickly-gathering clouds, presaging a snowstorm, warned him to give up an enterprise which might end disastrously.

The author's adventures on Mount Ararat and his visits to Erivan and Etchmiadzin occupy the smaller half of the book. The rest is a compilation, in which are collected legends connected with the country and with the Deluge, notes on the Kurds and Yezids, passages from the history of the Armenians, etc.; and, lastly, a chapter on the Armenian question.

Australian Essays. By Francis W. L. Adams. Melbourne: William Inglis and Co. London: Griffith, Farran, and Co., 1886. Pp. x. + 167. *Price* 1*s.*

Although this is a new edition, published, as mentioned on the cover, during the present year, the title-page still bears the date of the original issue. Only two of the seven articles which go to make up the little volume are at all geographical in their scope; and our remarks may, accordingly, be limited to these. They are on "Melbourne and her Civilisation," and "Sydney and her Civilisation." Both are full of information, and are pleasant reading, albeit characterised by a somewhat peculiar style of composition, and those interested in the two great centres of Australian population would do well to peruse them carefully. We notice the use of a small initial "a" in the word Australian. This is, surely, pure affectation. As well write "british Power" or "french Influence" as "australian Press."

The Mammalian Fauna of the Edinburgh District, with Records of Occurrences of the Rarer Species throughout the South-East of Scotland generally. By William Evans, F.R.S.E., Secretary to the Royal Physical Society. Edinburgh: M'Farlane and Erskine, 1892. (Only 200 copies printed.) Pp. 123. *Price* 5*s.*

The author has been well advised to extend, revise, and publish in book form a paper on the "Mammalian Fauna of the Edinburgh District," which was lately read before the Royal Physical Society, and received with much interest. A guide such as this was certainly called for; and the present treatise, complete, perspicuous, and compiled with all possible care, leaves nothing to be desired in the way of a companion to the naturalist in search of information about the animals occurring throughout the basin of the Forth and some adjoining areas. Mr. Evans' long experience and careful studies as an observer are here exhibited in a striking light, resulting in the best and most reliable list yet given to the public. There is an excellent index and a copious bibliography, while the text is illustrated by a number of neat engravings, from drawings by the author. The volume is well printed on excellent paper, and altogether we have nothing but the highest praise for this most excellent contribution to the study of the geographical distribution of animals.

The Paradise of the Pacific: Sketches of Hawaiian Scenery and Life. By the Rev. H. H. Gowen. London: Skeffington and Son, 1892. Pp. 180.

In this little volume, the author narrates his experiences in the Hawaiian Archipelago during his residence there as Chinese missionary. Consisting for the most part of letters written at different times, it does not pretend to give a complete account of the islands and their inhabitants, but describes in a readable style the incidents that came under the author's observation. When he goes further afield, Mr. Gowen gets beyond his depth, as, for instance, when he assigns to the Hawaiians an Aryan origin. But such digressions are few in number.

The Influence of the Netherlands in the making of the English Commonwealth and the American Republic. By Wm. Elliot Griffis, D.D. Boston, Massachusetts: De Wolfe, Fiske, & Co., n.d. Pp. 40. *Price* 15 *cents.*

This address was delivered by Dr. Griffis in justification and support of a movement for the erection, at Delftshaven, of a memorial of the Pilgrim Fathers who, after some years' stay in the Netherlands, began there the pilgrimage which ended in their becoming the first settlers in Massachusetts. As might be expected it contains the animated pleading of an enthusiastic advocate, rather than the cautious conclusions of a dispassionate inquirer. It seems undeniable that the Netherlands did exercise a considerable influence in England, especially in the eastern counties, in regard to manufactures, theological beliefs, and political movements, but to estimate the extent of the influence, and trace its working, demands a cooler and more sceptical temper than that of the eager advocate, and it would take a more critical method and less facility of assumption than Dr. Griffis manifests to decide how far the resemblances he relies on are the result of influence from without, and how far they are of native growth as the result of similar conditions working independently.

Victorian Year-Book for 1890-91. By Henry Heylyn Hayter, C.M.G. In two volumes. London: Trübner and Co., 1892. Vol. i., pp. 504, Index and Map. Vol. ii., pp. 500, Index and Statistical Tables.

We have again to welcome the appearance of this valuable *Year-Book*, and we are able to commend it again, as we did last year (vol. vii., pp. 277 and 395). The plan on which the *Year-Book* is compiled has undergone no change, and is highly satisfactory. Victoria is apparently in a prosperous condition. The population has increased by immigration between 1881 and 1891 by the addition of 116,360 persons. The recent census shows a proportion of nearly thirteen persons to the square mile, as against 9·8 persons in 1881. The death-rate in Victoria in 1890 was 16·10 per thousand, a lower rate than in any other Australian colony. The index is very full.

A Handbook for Travellers in India and Ceylon. London: John Murray, 1891. Pp. 440. *Price* 15*s.*

Several years have now passed since the learned and somewhat pedantic Orientalist, Eastwick, produced Murray's four guide-books to Bengal, Madras, Bombay, and the Panjab. They were too scholarly, too dear, and in a sense too good for the rapid Western traveller. The best portions have been condensed and brought down to date in this almost perfect volume, with its profusion of fine maps and plans. The latter fail in only one case, so far as we can discern—the North-West Railway towards Kandahar is not continued from Killa Abdullah to Chaman, as it ought to be, in the otherwise admirable section on Quetta. This is not merely the best guide to India—it is the only one, and is so good as to make a rival impossible.

Souvenir of the Lakes of Killarney and Glengariff. London, Edinburgh, and New York: T. Nelson and Sons, 1892. Pp. vi+47. *Price* 2*s.* 6*d.*

The publishers have evidently spared no pains in the production of this handsome and attractive little volume. It is illustrated by twenty-four well-executed chromo-lithograph views, and a number of smaller pictures and maps, all printed in colour, in the text. The descriptive matter is succinct and interesting, the binding artistic and tasteful, and, altogether, it is a most creditable production.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

ADDRESS TO THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION, EDINBURGH, 1892.

By Professor James Geikie, LL.D., D.C.L., F.R.SS.L. & E., F.G.S., President of the Section.

(*With a Map.*)

Amongst the many questions upon which of late years light has been thrown by deep-sea exploration and geological research, not the least interesting is that of the geographical development of coast-lines. How is the existing distribution of land and water to be accounted for? Are the revolutions in the relative position of land and sea, to which the geological record bears witness, due to movements of the earth's crust or of the hydrosphere? Why are coast-lines in some regions extremely regular, while elsewhere they are much indented? About 150 years ago the prevalent belief was that ancient sea-margins indicated a formerly higher ocean-level. Such was the view held by Celsius, who, from an examination of the coast-lands of Sweden, attributed the retreat of the sea to a gradual drying up of the latter. But this desiccation hypothesis was not accepted by Playfair, who thought it much more likely that the land had risen. It was not, however, until after Von Buch had visited Sweden (1806-1808), and published the results of his observations, that Playfair's suggestion received much consideration. Von Buch concluded that the apparent retreat of the sea was not due to a general depression of the ocean-level, but to elevation of the land—a conclusion which subsequently obtained the strong support of Lyell. The authority of these celebrated men gained for the elevation theory more or less complete assent, and for many years it has been the orthodox belief of geologists that the ancient sea-margins of Sweden and other lands have resulted from vertical movements of the crust. It has long been admitted, however,

that highly flexed and disturbed strata require some other explanation. Obviously such structures are the result of lateral compression and crumpling. Hence geologists have maintained that the mysterious subterranean forces have affected the crust in different ways. Mountain-ranges, they conceive, are ridged up by tangential thrusts and compression, while vast continental areas slowly rise and fall, with little or no disturbance of the strata. From this point of view it is the lithosphere that is unstable, all changes in the relative level of land and sea being due to crustal movements. Of late years, however, Trautschold and others have begun to doubt whether this theory is wholly true, and to maintain that the sea-level may have changed without reference to movements of the lithosphere. Thus Hilber has suggested that sinking of the sea-level may be due, in part at least, to absorption, while Schmick believes that the apparent elevation and depression of continental areas are really the results of grand secular movements of the ocean. The sea, according to him, periodically attains a high level in each hemisphere alternately, the waters being at present heaped up in the southern hemisphere. Professor Suess, again, believing that in equatorial regions the sea is, upon the whole, gaining on the land, while in other latitudes the reverse would appear to be the case, points out that this is in harmony with his view of a periodical flux and reflux of the ocean between the equator and the poles. He thinks that we have no evidence of any vertical elevation affecting wide areas, and that the only movements of elevation that take place are those by which mountains are upheaved. The broad invasions and transgressions of the continental areas by the sea, which we know have occurred again and again, are attributed by him to secular movements of the hydrosphere itself.

Apart from all hypothesis and theory, we learn that the surface of the sea is not exactly spheroidal. It reaches a higher level on the borders of the continents than in mid-ocean, and it varies likewise in height at different places on the same coast. The attraction of the Himalaya, for example, suffices to cause a difference of 300 feet between the level of the sea at the delta of the Indus and on the coast of Ceylon. The recognition of such facts has led Penck to suggest that the submergence of the maritime regions of North-west Europe and the opposite coasts of North America, which took place at a recent geological date, and from which the lands in question have only partially recovered, may have been brought about by the attraction exerted by the vast ice-sheets of the Glacial Period. But, as Drygalski, Woodward, and others have shown, the heights at which recent marine deposits occur in the regions referred to are much too great to be accounted for by any possible distortion of the hydrosphere. The late James Croll had previously endeavoured to show that the accumulation of ice over northern lands during glacial times would suffice to displace the earth's centre of gravity, and thus cause the sea to rise upon the glaciated tracts. More recently other views have been advanced to explain the apparently causal connection between glaciation and submergence, but these need not be considered here.

Whatever degree of importance may attach to the various hypotheses of secular movements of the sea, it is obvious that the general trends of

the world's coast-lines are determined in the first place by the position of the dominant wrinkles of the lithosphere. Even if we concede that all 'raised beaches,' so called, are not necessarily the result of earth-movements, and that the frequent transgressions of the continental areas by oceanic waters in geological times may possibly have been due to independent movements of the sea, still we must admit that the solid crust of the globe has always been subject to distortion. And this being so, we cannot doubt that the general trends of the world's coast-lines must have been modified from time to time by movements of the lithosphere.

As geographers we are not immediately concerned with the mode of origin of those vast wrinkles, nor need we speculate on the causes which may have determined their direction. It seems, however, to be the general opinion that the configuration of the lithosphere is due simply to the sinking-in and crumpling-up of the crust on the cooling and contracting nucleus. But it must be admitted that neither physicists nor geologists are prepared with a satisfactory hypothesis to account for the prominent trends of the great world-ridges and troughs. According to the late Professor Alexander Winchell, these trends may have been the result of primitive tidal action. He was of opinion that the transmeridional progress of the tidal swell in early incrustive times on our planet would give the forming crust structural characteristics and aptitudes trending from north to south. The earliest wrinkles to come into existence, therefore, would be meridional or submeridional, and such, certainly, is the prevalent direction of the most conspicuous earth-features. There are many terrestrial trends, however, as Professor Winchell knew, which do not conform to the requirements of his hypothesis; but such transmeridional features, he thought, could generally be shown to be of later origin than the others. This is the only speculation, so far as I know, which attempts, perhaps not altogether unsuccessfully, to explain the origin of the main trends of terrestrial features. According to other authorities, however, the area of the earth's crust occupied by the ocean is denser than that over which the continental regions are spread. The depressed denser part balances the lighter elevated portion. But why these regions of different densities should be so distributed no one has yet told us. Neither does Le Conte's view, that the continental areas and the oceanic depressions owe their origin to unequal radial contraction of the earth in its secular cooling, help us to understand why the larger features of the globe should be disposed as they are.

Geographers must for the present be content to take the world as they find it. What we do know is that our lands are distributed over the surface of a great continental plateau of irregular form, the bounding slopes of which plunge down more or less steeply into a vast oceanic depression. So far as geological research has gone, there is reason to believe that these elevated and depressed areas are of primeval antiquity —that they antedate the very oldest of the sedimentary formations. There is abundant evidence, however, to show that the relatively elevated or continental area has been again and again irregularly submerged under tolerably deep and wide seas. But all historical geology assures us that the continental plateau and the oceanic hollows have never

changed places, although from time to time portions of the latter have been ridged up and added to the margins of the former, while ever and anon marginal portions of the plateau have sunk down to very considerable depths. We may thus speak of the great world-ridges as regions of dominant elevation, and of the profound oceanic troughs as areas of more or less persistent depression. From one point of view, it is true, no part of the earth's surface can be looked upon as a region of dominant elevation. Our globe is a cooling and contracting body, and depression must always be the prevailing movement of the lithosphere. The elevation of the continental plateau is thus only relative. Could we conceive the crust throughout the deeper portions of the oceanic depression to subside to still greater depths, while at the same time the continental plateau remained stationary, or subsided more slowly, the sea would necessarily retreat from the land, and the latter would then appear to rise. It is improbable, however, that any extensive subsidence of the crust under the ocean could take place without accompanying disturbance of the continental plateau; and in this case the latter might experience in places not only negative but positive elevation. During the evolution of our continents, crustal movements have again and again disturbed the relative level of land and sea; but since the general result has been to increase the land surface and to contract the area occupied by the sea, it is convenient to speak of the former as the region of dominant elevation, and of the latter as that of prevalent depression. Properly speaking, both are sinking regions, the rate of subsidence within the oceanic trough being in excess of that experienced over the continental plateau. The question of the geographical development of coast-lines is therefore only that of the dry lands themselves.

The greater land masses are all situated upon, but are nowhere co-extensive with, the area of dominant elevation, for very considerable portions of the continental plateau are still covered by the sea. Opinions may differ as to which fathoms-line we should take as marking approximately the boundary between that region and the oceanic depression; and it is obvious, indeed, that any line selected must be arbitrary and more or less misleading, for it is quite certain that the true boundary of the continental plateau cannot lie parallel to the surface of the ocean. In some regions it approaches within a few hundreds of fathoms of the sea-level; in other places it sinks for considerably more than 1000 fathoms below that level. Thus, while a very moderate elevation would in certain latitudes cause the land to extend to the edge of the plateau, an elevation of at least 10,000 feet would be required in some other places to bring about a similar result.

Although it is true that the land surface is nowhere co-extensive with the great plateau, yet the existing coast-lines may be said to trend in the same general direction as its margins. So abruptly does the continental plateau rise from the oceanic trough, that a depression of the sea-level, or an elevation of the plateau, for 10,000 feet, would add only a narrow belt to the Pacific Coast between Alaska and Cape Horn, while the gain of land on the Atlantic slope of America between 30° N.L. and 40° S.L. would not be much greater. In the higher latitudes of the

Northern Hemisphere, however, very considerable geographical changes would be accomplished by a much less amount of elevation of the plateau. Were the continental plateau to be upheaved for 3000 feet, the major portion of the Arctic Sea would become land. Thus, in general terms, we may say that the coast-lines of Arctic and temperate North America and Eurasia are further withdrawn from the edge of the continental plateau than those of lower latitudes.

In regions where existing coast-lines approach the margin of the plateau, they are apt to run for long distances in one determinate direction, and, whether the coastal area be high or not, to show a gentle sinuosity. Their course is seldom interrupted by bold projecting headlands or peninsulas, or by intruding inlets, while fringing or marginal islands rarely occur. To these appearances the northern regions, as every one knows, offer the strongest contrast. Not only do they trend irregularly, but their continuity is constantly interrupted by promontories and peninsulas, by inlets and fiords, while fringing islands abound. But an elevation of some 400 or 500 fathoms only would revolutionise the geography of those regions, and confer upon the northern coast-lines of the world the regularity which at present characterises those of Western Africa.

It is obvious, therefore, that the coast-lines of such lands as Africa owe their regularity primarily to their approximate coincidence with the steep boundary slopes of the continental plateau, while the irregularities characteristic of the coast-line of North-western Europe and the corresponding latitudes of North America are determined by the superficial configuration of the same plateau, which in those regions is relatively more depressed. I have spoken of the general contrast between high and low northern latitudes; but it is needless to say that in southern regions the coast-lines exhibit similar contrasts. The regular coast-lines of Africa and South America have already been referred to; but we cannot fail to recognise in the much-indented sea-board and the numerous coastal islands of Southern Chili a complete analogy to the fiord regions of high northern latitudes. Both are areas of comparatively recent depression. Again, the manifold irregularities of the coasts of South-eastern Asia, and the multitudes of islands that serve to link that continent to Australia and New Zealand, are all evidence that the surface of the continental plateau in those regions is extensively invaded by the sea.

A word or two now as to the configuration of the oceanic trough. There can be no doubt that this differs very considerably from that of the land surface. It is, upon the whole, flat or gently undulating. Here and there it swells gently upwards into broad elevated banks, some of which have been traced for great distances. In other places narrower ridges and abrupt mountain-like elevations diversify its surface, and project again and again above the level of the sea, to form the numerous islets of Oceania. Once more, the sounding-line has made us acquainted with the notable fact that numerous deep depressions—some long and narrow, others relatively short and broad—stud the floor of the great trough. I shall have occasion to refer again to these remarkable depressions, and

need at present only call attention to the fact that they are especially well developed in the region of the Western Pacific, where the floor of the sea, at the base of the bounding slopes of the continental plateau, sinks in places to depths of three and even of five miles below the existing coast-lines. One may further note the fact that the deepest areas of the Atlantic are met with in like manner close to the walls of the plateau —a long ridge, which rises midway between the continents and runs in the same general direction as their coast-lines, serving to divide the trough of the Atlantic into two parallel hollows.

But, to return to our coast-lines and the question of their development, it is obvious that their general trends have been determined by crustal movements. Their regularity is in direct proportion to the closeness of their approach to the margin of the continental plateau. The more nearly they coincide with the edge of that plateau, the fewer irregularities do they present; the further they recede from it, the more highly are they indented. Various other factors, it is true, have played a more or less important part in their development, but their dominant trends were undoubtedly determined at a very early period in the world's history—their determination necessarily dates back, in short, to the time when the great world-ridges and oceanic troughs came into existence. So far as we can read the story told by the rocks, however, it would seem that in the earliest ages of which geology can speak with any confidence, the coast-lines of the world must have been infinitely more irregular than now. In Palæozoic times, relatively small areas of the continental plateau appeared above the level of the sea. Insular conditions everywhere prevailed. But as ages rolled on, wider and wider tracts of the plateau were exposed, and this notwithstanding many oscillations of level. So that one may say there has been upon the whole a general advance from insular to continental conditions. In other words, the sea has continued to retreat from the surface of the continental plateau. To account for this change, we must suppose that depression of the crust has been in excess within the oceanic area, and that now and again positive elevation of the continental plateau has taken place, more especially along its margins. That movements of elevation, positive or negative, have again and again affected our land areas can be demonstrated, and it seems highly probable, therefore, that similar movements may have been experienced within the oceanic trough.

Two kinds of crustal movement, as we have seen, are recognised by geologists. Sometimes the crust appears to rise, or, as the case may be, to sink over wide regions, without much disturbance or tilting of strata, although these are now and again more or less extensively fractured and displaced. It may conduce to clearness if we speak of these movements as regional. The other kind of crustal disturbance takes place more markedly in linear directions, and is always accompanied by abrupt folding and mashing together of strata, along with more or less fracturing and displacement. The plateau of the Colorado has often been cited as a good example of regional elevation, where we have a wide area of approximately horizontal strata apparently uplifted without much rock-disturbance, while the Alps

or any other chain of highly flexed and convoluted strata will serve as an example of what we may term axial or linear uplifts. It must be understood that both regional and axial movements result from the same cause—the adjustment of the solid crust to the contracting nucleus—and that the term *elevation*, therefore, is only relative. Sometimes the sinking crust gets relief from the enormous lateral pressure to which it is subjected by crumpling up along lines of weakness, and then mountains of elevation are formed; at other times, the pressure is relieved by the formation of broader swellings, when wide areas become uplifted relatively to surrounding regions. Geologists, however, are beginning to doubt whether upheaval of the latter kind can affect a broad continental area. Probably, in most cases, the apparent elevation of continental regions is only negative. The land appears to have risen because the floor of the oceanic basin has become depressed. Even the smaller plateau-like elevations which occur within some continental regions may in a similar way owe their dominance to the sinking of contiguous regions.

In the geographical development of our land, movements of elevation and depression have played an important part. But we cannot ignore the work done by other agents of change. If the orographical features of the land everywhere attest the potency of plutonic agents, they no less forcibly assure us that the inequalities of surface resulting from such movement are universally modified by denudation and sedimentation. Elevated plains and mountains are gradually demolished, and the hollows and depressions of the great continental plateau become slowly filled with their detritus. Thus inland seas tend to vanish, inlets and estuaries are silted up, and the land in places advances seaward. The energies of the sea, again, come in to aid those of rain and rivers, so that under the combined action of all the superficial agents of change, the irregularities of coast-lines become reduced, and, were no crustal movement to intervene, would eventually disappear. The work accomplished by those agents upon a coast-line is most conspicuous in regions where the surface of the continental plateau is occupied by comparatively shallow seas. Here full play is given to sedimentation and marine erosion, while the latter alone comes into prominence upon shores that are washed by deeper waters. When the coast-lines advance to the edge of the continental plateau, they naturally trend, as we have seen, for great distances in some particular direction. Should they preserve that position, undisturbed by crustal oscillation, for a prolonged period of time, they will eventually be cut back by the sea. In this way a shelf or terrace will be formed, narrow in some places, broader in others, according to the resistance offered by the varying character of the rocks. But no long inlets or fiords can result from such action. At most the harder and less readily demolished rocks will form headlands, while shallow bays will be scooped out of the more yielding masses. In short, between the narrower and broader parts of the eroded shelf or terrace a certain proportion will tend to be preserved. As the shelf is widened, sedimentation will become more and more effective, and in places may come to protect the land from further marine erosion. This action is especially conspicuous in tropical and subtropical regions, which are characterised by well-

marked rainy seasons. In such regions immense quantities of sediment are washed down from the land to the sea, and tend to accumulate along shore, forming low alluvial flats. All long-established coast-lines thus acquire a characteristically sinuous form, and perhaps no better examples could be cited than those of Western Africa.

To sum up, then, we may say that the chief agents concerned in the development of coast-lines are crustal movements, sedimentation, and marine erosion. All the main trends are the result of elevation and depression. Considerable geographical changes, however, have been brought about by the silting up of those shallow and sheltered seas which, in certain regions, overflow wide areas of the continental plateau. Throughout all the ages, indeed, epigene agents have striven to reduce the superficial inequalities of that plateau, by levelling heights and filling up depressions, and thus, as it were, flattening out the land surface and causing it to extend. The erosive action of the sea, from our present point of view, is of comparatively little importance. It merely adds a few finishing touches to the work performed by the other agents of change.

A glance at the geographical evolution of our own continent will render this sufficiently evident. Viewed in detail, the structure of Europe is exceedingly complicated, but there are certain leading features in its architecture which no profound analysis is required to detect. We note, in the first place, that highly disturbed rocks of Archæan and Palæozoic age reach their greatest development along the north-western and western borders of our continent, as in Scandinavia, the British Islands, North-west France, and the Iberian peninsula. Another belt of similarly disturbed strata of like age traverses Central Europe from west to east, and is seen in the south of Ireland, Cornwall, North-west France, the Ardennes, the Thüringerwald, the Erzgebirge, the Riesengebirge, the Böhmerwald, and other heights of Middle and Southern Germany. Strata of Mesozoic and Cainozoic age rest upon the older systems in such a way as to show that the latter had been much folded, fractured, and denuded before they came to be covered with younger formations. North and north-east of the central belt of ancient rocks just referred to, the sedimentary strata that extend to the shores of the Baltic and over a vast region in Russia, range in age from Palæozoic down to Cainozoic times, and are disposed for the most part in gentle undulations—they are either approximately horizontal or slightly inclined. Unlike the disturbed rocks of the maritime regions and of Central Europe, they have obviously been subjected to comparatively little folding since the time of their deposition. To the south of the primitive backbone of Central Europe succeeds a region composed superficially of Mesozoic and Cainozoic strata for the most part, which, along with underlying Palæozoic and Archæan rocks, are often highly flexed and ridged up, as in the chains of the Jura, the Alps, the Carpathians, etc. One may say, in general terms, that throughout the whole Mediterranean area Archæan and Palæozoic rocks appear at the surface only when they form the nuclei of mountains of elevation into the composition of which rocks of younger age largely enter.

From this bald and meagre outline of the general geological struc-

ture of Europe, we may gather that the leading orographical features of our continent began to be developed at a very early period. Unquestionably the oldest land areas are represented by the disturbed Archæan and Palæozoic rocks of the Atlantic sea-board and Central Europe. Examination of those tracts shows that they have experienced excessive denudation. The Archæan and Palæozoic masses, distributed along the margin of the Atlantic, are the mere wrecks of what, in earlier ages, must have been lofty regions, the mountain-chains of which may well have rivalled or even exceeded in height the Alps of to-day. They, together with the old disturbed rocks of Central Europe, formed for a long time the only land in our area. Between the ancient Scandinavian tract in the North and a narrow interrupted belt in Central Europe, stretched a shallow sea, which covered all the regions that now form our Great Plain; while immediately south of the central belt lay the wide depression of the Mediterranean—for as yet the Pyrenees, the Alps, and the Carpathians were not. Both the Mediterranean and the Russo-Germanic sea communicated with the Atlantic. As time went on land continued to be developed along the same lines, a result due partly to crustal movements, partly to sedimentation. Thus by-and-by the relatively shallow Russo-Germanic sea became silted up, while the Mediterranean shore-line advanced southwards. It is interesting to note that the latter sea, down to the close of Tertiary times, seems always to have communicated freely with the Atlantic, and to have been relatively deep. The Russo-Germanic sea, on the contrary, while now and again opening widely into the Atlantic, and attaining considerable depths in its western reaches, remained on the whole shallow, and ever and anon vanished from wide areas to contract into a series of inland seas and large salt lakes.

Reduced to its simplest elements, therefore, the structure of Europe shows two primitive ridges—one extending with some interruptions along the Atlantic sea-board, the other traversing Central Europe from west to east, and separating the area of the Great Plain from the Mediterranean basin. The excessive denudation which the more ancient lands have undergone, and the great uplifts of Mesozoic and of Cainozoic times, together with the comparatively recent submergence of broad tracts in the north and north-west, have not succeeded in obscuring the dominant features in the architecture of our continent.

I now proceed to trace, as rapidly as I can, the geographical development of the coast-lines of the Atlantic as a whole, and to point out the chief contrasts between them and those of the Pacific. The extreme irregularity of the Arctic and Atlantic shores of Europe at once suggests to a geologist a partially drowned land, the superficial inequalities of which are accountable for the vagaries of the coast-lines. The fiords of Norway and Scotland occupy what were at no distant date land valleys, and the numerous marginal islands of those regions are merely the projecting portions of a recently-sunken area. The continental plateau extends up to and a little beyond the one hundred fathoms line, and there are many indications that the land formerly reached as far. Thus the sunken area is traversed by valley-like depressions, which widen as they pass outwards to the edge of the plateau, and have all the appear-

ance of being hollows of subaerial erosion. I have already mentioned the fact that the Scandinavian uplands and the Scottish Highlands are the relics of what were at one time true mountains of elevation, corresponding in the mode of their formation to those of Switzerland, and, like these, attaining a great elevation. During subsequent stages of Palæozoic time, that highly-elevated region was subjected to long-continued and profound erosion—the mountain country was planed down over wide regions to sea-level, and broad stretches of the reduced land surface became submerged. Younger Palæozoic formations then accumulated upon the drowned land, until eventually renewed crustal disturbance supervened, and the marginal areas of the continental plateau again appeared as dry land, but not, as before, in the form of mountains of elevation. Lofty table-lands now took the place of abrupt and serrated ranges and chains—table-lands which, in their turn, were destined in the course of long ages to be deeply sculptured and furrowed by subaerial agents. During this process the European coast-line would seem to have coincided more or less closely with the edge of the continental plateau. Finally, after many subsequent movements of the crust in these latitudes, the land become partially submerged—a condition from which North-western and Northern Europe would appear in recent times to be slowly recovering. Thus the highly indented coast-line of those regions does not coincide with the edge of the plateau, but with those irregularities of its upper surface which are the result of antecedent subaerial erosion.

Mention has been made of the Russo-Germanic plain and the Mediterranean as representing original depressions in the continental plateau, and of the high grounds that extend between them as regions of dominant elevation, which, throughout all the manifold revolutions of the past, would appear to have persisted as a more or less well-marked boundary, separating the northern from the southern basin. During certain periods it was no doubt in some degree submerged, but never apparently to the same extent as the depressed areas it served to separate. From time to time uplifts continued to take place along this central belt, which thus increased in breadth, the younger formations, which were accumulated along the margins of the two basins, being successively ridged up against nuclei of older rocks. The latest great crustal movements in our continent, resulting in the uplift of the Alps and other east and west ranges of similar age, have still further widened that ancient belt of dominant elevation which in our day forms the most marked orographical feature of Europe.

The Russo-Germanic basin is now for the most part land, the Baltic and the North Sea representing its still submerged portions. This basin, as already remarked, was probably never so deep as that of the Mediterranean. We gather as much from the fact that, while mechanical sediments of comparatively shallow-water origin predominate in the former area, limestones are the characteristic features of the southern region. Its relative shallowness helps us to understand why the northern depression should have been silted up more completely than the Mediterranean. We must remember also that for long ages it received the drainage of a much more extensive land surface than the latter—the

land that sloped towards the Mediterranean in Palæozoic and Mesozoic times being of relatively little importance. Thus the crustal movements which ever and anon depressed the Russo-Germanic area were, in the long-run, counterbalanced by sedimentation. The uplift of the Alps, the Atlas, and other east and west ranges, has greatly contracted the area of the Mediterranean, and sedimentation has also acted in the same direction, but it is highly probably that that sea is now as deep as, or even deeper than, it has ever been. It occupies a primitive depression in which the rate of subsidence has exceeded that of sedimentation. In many respects, indeed, this remarkable transmeridional hollow—continued eastward in the Red Sea, the Black Sea, and the Aralo-Caspian depression —is analogous, as we shall see, to the great oceanic trough itself.

In the earlier geological periods linear or axial uplifts and volcanic action again and again marked the growth of the land on the Atlantic sea-board. But after Palæozoic times, no great mountains of elevation came into existence in that region, while volcanic action almost ceased. In Tertiary times, it is true, there was a remarkable recrudescence of volcanic activity, but the massive eruptions of Antrim and Western Scotland, of the Færöe Islands and Iceland, must be considered apart from the general geology of our continent. From Mesozoic times onwards it was along the borders of the Mediterranean depression that great mountain uplifts and volcanoes chiefly presented themselves; and as the land surface extended southwards from Central Europe, and the area of the Mediterranean was contracted, volcanic action followed the advancing shore-lines. The occurrence of numerous extinct and of still existing volcanoes along the borders of this inland sea, the evidence of recent crustal movements so commonly met with upon its margins, the great irregularities of its depths, the proximity of vast axial uplifts of late geological age, and the frequency of earthquake phenomena, all indicate instability, and remind us strongly of similarly constructed and disturbed regions within the area of the vast Pacific.

Let us now look at the Arctic and Antarctic coast-lines of North America. From the extreme north down to the latitude of New York the shores are obviously those of a partially submerged region. They are of the same type as the coasts of North-western Europe. We have every reason to believe also that the depression of Greenland and North-east America, from which these lands have only partially recovered, dates back to a comparatively recent period. The fiords and inlets, like those of Europe, are merely half-drowned land valleys, and the continental shelf is crossed by deep hollows which are evidently only the seaward continuations of well-marked terrestrial features. Such, for example, is the case with the valleys of the Hudson and the St. Lawrence, the submerged portions of which can be followed out to the edge of the continental plateau, which is notched by them at depths of 474 and 622 fathoms respectively. There is, in short, a broad resemblance between the coasts of the entire Arctic and North Atlantic regions down to the latitudes already mentioned. Everywhere they are irregular and fringed with islands in less or greater abundance—highly denuded and deeply incised plateaus being penetrated by fiords, while low-lying and undulating lands

that shelve gently seaward are invaded by shallow bays and inlets. Comparing the American with the opposite European coasts one cannot help being struck with certain other resemblances. Thus Hudson Bay at once suggests the Baltic, and the Gulf of Mexico, with the Caribbean Sea, recall the Mediterranean. But the geological structure of the coast-lands of Greenland and North America betrays a much closer resemblance between these and the opposite shores of Europe than appears on a glance at the map. There is something more than a mere superficial similarity. In eastern North America and Greenland, just as in Western Europe, no grand mountain uplifts have taken place for a prodigious time. The latest great upheavals, which were accompanied by much folding and flexing of strata, are those of the Appalachian chain and of the coastal ranges extending through New England, Nova Scotia, and Newfoundland, all of which are of Palæozoic age. Considerable crustal movements affected the American coast-lines in Mesozoic times, and during these uplifts the strata suffered fracture and displacement, but were subjected to comparatively little folding. Again, along the maritime borders of North-east America, as in the corresponding coast-lines of Europe, igneous action, more or less abundant in Palæozoic and early Mesozoic times, has since been quiescent. From the mouth of the Hudson to the Straits of Florida the coast-lines are composed of Tertiary and Quaternary deposits. This shows that the land has continued down to recent times to gain upon the sea—a result brought about partly by quiet crustal movements, but to a large extent by sedimentation, aided, on the coasts of Florida, by the action of reef-building corals.

Although volcanic action has long ceased on the American sea-board, we note that in Greenland, as in the West of Scotland and North of Ireland, there is abundant evidence of volcanic activity at so late a period as the Tertiary. It would appear that the great plateau-basalts of those regions, and of Iceland and the Færöe Islands, were contemporaneous, and possibly connected with an important crustal movement. It has long been suggested that at a very early geological period Europe and North America may have been united. The great thickness attained by the Palæozoic rocks in the eastern areas of the latter implies the existence of a wide land surface from which ancient sediments were derived. That old land must have extended beyond the existing coast-line, but how far we cannot tell. Similarly in north-west Europe, during early Palæozoic times, the land probably stretched further into the Atlantic than at present. But whether, as some think, an actual land connection subsisted between the two continents it is impossible to say. Some such connection was formerly supposed necessary to account for the emigration and immigration of certain marine forms of life which are common to the Palæozoic strata of both continents, and which, as they were probably denizens of comparatively shallow water, could only have crossed from one area to another along a shore-line. It is obvious, indeed, that if the oceanic troughs in those early days were of an abysmal character, a belt of shallow water would be required to explain the geographical distribution of cosmopolitan marine life-forms. But if it be true that subsidence of the crust has been going on through all geo-

logical time, and that the land areas have notwithstanding continued to extend over the continental plateau, then it follows that the oceanic trough must be deeper now than it was in Palæozoic times. There are, moreover, certain geological facts which seem hardly explicable on the assumption that the seas of past ages attained abysmal depths over any extensive areas. The Palæozoic strata which enter so largely into the framework of our lands have much the same appearance all the world over, and were accumulated for the most part in comparatively shallow water. A petrographical description of the Palæozoic mechanical sediments of Europe would serve almost equally well for those of America, of Asia, or of Australia. Take in connection with this the fact that Palæozoic faunas had a very much wider range than those of Mesozoic and later ages, and were characterised above all by the presence of many cosmopolitan species, and we can hardly resist the conclusion that it was the comparative shallowness of the ancient seas that favoured that wide dispersal of species, and enabled currents to distribute sediments the same in kind over such vast regions. As the oceanic area deepened and contracted, and the land surface increased, marine faunas were gradually restricted in their range, and cosmopolitan marine forms diminished in numbers, while sediments, gathering in separate regions, became more and more differentiated. For these and other reasons, which need not be entered upon here, I see no necessity for supposing that a Palæozoic Atlantis connected Europe with North America. The broad ridge upon which the Færöe Islands and Iceland are founded seems to pertain as truly to the oceanic depression as the long Dolphin Ridge of the South Atlantic. The trend of the continental plateau in high latitudes is shown, as I think, by the general direction of the coast-lines of North-western Europe and East Greenland, the continental shelf being submerged in those regions for a few hundred fathoms only. How the Icelandic ridge came into existence, and what its age may be, we can only conjecture. It may be a wrinkle as old as the oceanic trough which it traverses, or its origin may date back to a much more recent period. We may conceive it to be an area which has subsided more slowly than the floor of the ocean to the north and south; or, on the other hand, it may be a belt of positive elevation. Perhaps the latter is the more probable supposition, for it seems very unlikely that crustal disturbances, resulting in axial and regional uplifts, should have been confined to the continental plateau only. Be that as it may, there is little doubt that land connection did obtain between Greenland and Europe in Cainozoic times, along this Icelandic ridge, for relics of the same Tertiary flora are found in Scotland, the Færöe Islands, Iceland, and Greenland. The deposits in which these plant-remains occur are associated with great sheets of volcanic rocks, which in the Færöe Islands and Iceland reach a thickness of many thousand feet. Of the same age are the massive basalts of Jan Mayen, Spitzbergen, Franz Joseph Land, and Greenland. These lavas seem seldom to have issued from isolated foci in the manner of modern eruptions, but rather to have welled up along the lines of rectilineal fissures. From the analogy of similar phenomena in other parts of the world it might be inferred that the volcanic action

of these northern regions may have been connected with a movement of elevation, and that the Icelandic ridge, if it did not come into existence during the Tertiary period, was at all events greatly upheaved at that time. It would seem most likely, in short, that the volcanic action in question was connected mainly with crustal movements in the oceanic trough. Similar phenomena, as is well known, are met with further south in the trough of the Atlantic. Thus the volcanic Azores rise like Iceland from the surface of a broad ridge which is separated from the continental plateau by wide and deep depressions. And so again, from the back of the great Dolphin Ridge, spring the volcanic islets of St. Paul's, Ascension, and Tristan d'Acunha.

I have treated of the Icelandic bank at some length for the purpose of showing that its volcanic phenomena do not really form an exception to the rule that such eruptions ceased after Palæozoic or early Mesozoic times to disturb the Atlantic coast-lines of Europe and North America. As the bank in question extends between Greenland and the British Islands, it was only natural that both those regions should be affected by its movements. But its history pertains essentially to that of the Atlantic trough ; and it seems to show us how transmeridional movements of the crust, accompanied by vast discharges of igneous rock, may come in time to form land connections between what are now widely separated areas.

Let us next turn our attention to the coast-lines of the Gulf of Mexico and the Caribbean Sea. These enclosed seas have frequently been compared to the Mediterranean, and the resemblance is self-evident. Indeed, it is so close that one may say the Mexican-Caribbean Sea and the Mediterranean are rather homologous than simply analogous. The latter, as we have seen, occupies a primitive depression, and formerly covered a much wider area. It extended at one time over much of Southern Europe and Northern Africa, and appears to have had full communication across Asia Minor with the Indian Ocean, and with the Arctic Ocean athwart the low-lying tracts of North-western Asia. Similarly, it would seem, the Mexican-Caribbean Sea is the remaining portion of an ancient inland sea which formerly stretched north through the heart of North America to the Arctic Ocean. Like its European parallel, it has been diminished by sedimentation and crustal movements. It resembles the latter also in the greatness and irregularity of its depths, and in the evidence which its islands supply of volcanic action as well as of very considerable crustal movements within recent geological times. Along the whole northern borders of the Gulf of Mexico the coast-lands, like those on the Atlantic sea-board of the Southern states, are composed of Tertiary and recent accumulations, and the same is the case with Yucatan ; while similar young formations are met with on the borders of the Caribbean Sea and in the Antilles. The Bahamas and the Windward Islands mark out for us the margin of the continental plateau, which here falls away abruptly to profound depths. One feels assured that this portion of the plateau has been ridged up to its present level at no distant geological date. But notwithstanding all the evidence of recent extensive crustal movements in this region, it is

obvious that the Mexican-Caribbean depression, however much it may have been subsequently modified, is of primitive origin.[1]

Before we leave the coast-lands of North America. I would again point out their leading geological features. In a word, then, they are composed for the most part of Archæan and Palæozoic rocks; no great linear or axial uplifts marked by much flexure of strata have taken place in those regions since Palæozoic times; while igneous action virtually ceased about the close of the Palæozoic or the commencement of the Mesozoic period. It is not before we reach the shores of the Southern States and the coast-lands of the Mexican-Caribbean Sea that we encounter notable accumulations of Mesozoic, Tertiary, and younger age. These occur in approximately horizontal positions round the Gulf of Mexico, but in the Sierra Nevada of Northern Colombia and the Cordilleras of Venezuela Tertiary strata enter into the formation of true mountains of elevation. Thus the Mexican-Caribbean depression, like that of the Mediterranean, is characterised not only by its irregular depths and its volcanic phenomena, but by the propinquity of recent mountains of upheaval, which bear the same relation to the Caribbean Sea that the mountains of North Africa do to the Mediterranean.

We may now compare the Atlantic coasts of South America with those of Africa. The former coincide in general direction with the edge of the continental plateau, to which they closely approach between Cape St. Roque and Cape Frio. In the north-east, between Cape Paria, opposite Trinidad, and Cape St. Roque, the continental shelf attains a considerably greater breadth, while south of Cape Frio it gradually widens until, in the extreme south, it runs out towards the east in the form of a narrow ridge, upon the top of which rise the Falkland Islands and South Georgia. Excluding from consideration for the present all recent alluvial and Tertiary deposits, we may say that the coast-lands from Venezuela down to the south of Brazil are composed principally of Archæan rocks; the eastern borders of the continent further south being formed of Quaternary and Tertiary accumulations. So far as we know, igneous rocks are of rare occurrence on the Atlantic sea-board. Palæozoic strata approach the coast-lands at various points between the mouths of the Amazons and La Plata, and these, with the underlying and surrounding Archæan rocks, are more or less folded and disturbed, while the younger strata of Mesozoic and Cainozoic age (occupying wide regions in the basin of the Amazons, and here and there fringing the sea-coast), occur in approximately horizontal positions. It would appear, therefore, that no great axial uplifts have taken place in those regions since Palæozoic times. The crustal movements of later ages were regional rather than axial; the younger rocks are not flexed and mashed together, and their elevation (negative or positive) does not seem to have been accompanied by conspicuous volcanic action.

[1] Professor Suess thinks it is probable that the Caribbean Sea and the Mediterranean are portions of one and the same primitive depression which traversed the Atlantic area in early Cretaceous times. He further suggests that it may have been through the gradual widening of the central Mediterranean that the Atlantic in later times came into existence.

The varying width of the continental shelf is due to several causes. The Orinoco, the Amazons, and other rivers descending to the north-east coast, carry enormous quantities of sediment, much of which comes to rest on the submerged slopes of the continental plateau, so that the continental shelf tends to extend seawards. The same process takes place on the south-east coast, where the River Plate discharges its muddy waters. South of latitude 40° S., however, another cause has come into play. From the mouth of the Rio Negro to the terminal point of the continent the whole character of the coast betokens a geologically recent emergence, accompanied and followed by considerable marine erosion. So that in this region the continental shelf increases in width by the retreat of the coast-line, while in the north-east it gains by advancing seawards. It is to be noted, however, that even there, in places where the shores are formed of alluvia, the sea tends to encroach upon the land.

The Atlantic coast of Africa resembles that of South America in certain respects, but it also offers some important contrasts. As the northern coasts of Venezuela and Colombia must be considered in relation rather to the Caribbean depression than to the Atlantic, so the African sea-board between Cape Spartel and Cape Nun pertains structurally to the Mediterranean region. From the southern limits of Morocco to Cape Colony the coastal heights are composed chiefly of Archæan and Palæozoic rocks, the low shore-lands showing here and there strata of Mesozoic and Tertiary age together with still more recent deposits. The existing coast-lines everywhere advance close to the edge of the continental plateau, so that the submarine shelf is relatively narrower than that of eastern South America. The African coast is still further distinguished from that of South America by the presence of several groups of volcanic islands—Fernando Po and others in the Gulf of Guinea, and Cape Verde and Canary Islands. The last-named group, however, notwithstanding its geographical position, is probably related rather to the Mediterranean depression than to the Atlantic trough.

The geological structure of the African coast-lands shows that the earliest to come into existence were those that extend between Cape Nun and the Cape of Good Hope. The coastal ranges of that section are much denuded, for they are of very great antiquity, having been ridged up in Palæozoic times. The later uplifts (negative or positive) of the same region were not attended by tilting and folding of strata, for the Mesozoic and Tertiary deposits, like those of South America, lie in comparatively horizontal positions. Between Cape Nun and Cape Spartel the rocks of the maritime tracts range in age from Palæozoic to Cainozoic, and have been traced across Morocco into Algeria and Tunis. They all belong to the Mediterranean region, and were deposited at a time when the southern shores of that inland sea extended from a point opposite the Canary Islands along what is now the southern margin of Morocco, Algeria, and Tunis. Towards the close of the Tertiary period the final upheaval of the Atlas took place, and the Mediterranean, retreating northwards, became an almost land-locked sea.

I need hardly stop to point out how the African coast-lines have been

modified by marine erosion and the accumulation of sediment upon the continental shelf. The extreme regularity of the coasts is due partly to the fact that the land is nearly co-extensive with the continental plateau, but it also results in large measure from the extreme antiquity of the land itself. This has allowed of the cutting-back of headlands and the filling up of bays and inlets, a process which has been going on between Morocco and Cape Colony with probably little interruption for a very prolonged period of time. We may note also the effect of the heavy rains of the equatorial region in washing down detritus to the shores, and in this way protecting the land to some extent from the erosive action of the sea.

What now, let us ask, are the outstanding features of the coast-lines of the Atlantic Ocean? We have seen that along the margins of each of the bordering continents the last series of great mountain-uplifts took place in Palæozoic times. This is true alike for North and South America, for Europe and Africa. Later movements which have added to the extent of land were not marked by the extreme folding of strata which attended the early upheavals. The Mesozoic and Cainozoic rocks, which now and again form the shore-lands, occur in more or less undisturbed condition. The only great linear uplifts or true mountains of elevation which have come into existence in Western Europe and North Africa since the Palæozoic period trend approximately at right angles to the direction of the Atlantic trough, and are obviously related to the primitive depression of the Mediterranean. The Pyrenees and the Atlas, therefore, although their latest elevation took place in Tertiary times, form no exceptions to the rule that the extreme flexing and folding of strata which is so conspicuous a feature in the geological structure of the Atlantic sea-board dates back to the Palæozoic era. And the same holds true of North and South America. There all the coastal ranges of highly flexed and folded strata are of Palæozoic age. The Cordilleras of Venezuela are no doubt a Tertiary uplift, but they are as obviously related to the Caribbean depression as the Atlas ranges are to that of the Mediterranean. Again, we note that volcanic activity along the borders of the Atlantic was much less pronounced during the Mesozoic period than it appears to have been in the earlier ages. Indeed, if we except the great Tertiary basalt-flows of the Icelandic ridge and the Arctic regions, we may say that volcanic action almost ceased after the Palæozoic era to manifest itself upon the Atlantic coast-lands of North America and Europe. But while volcanic action has died out upon the Atlantic margins of both continents, it has continued during a prolonged geological period within the area of the Mediterranean depression. And in like manner the corresponding depression between North and South America has been the scene of volcanic disturbances from Mesozoic down to recent times. Along the African coasts the only displays of recent volcanic action that appertain to the continental margin are those of the Gulf of Guinea and the Cape de Verde Islands. The Canary Islands and Madeira may come under the same category, but, as we have seen, they appear to stand in relationship to the Mediterranean depression and the Tertiary uplift of North Africa. Of Iceland

and the Azores I have already spoken, and of Ascension and the other volcanic islets of the South Atlantic it is needless to say that they are related to wrinkles in the trough of the ocean, and therefore have no immediate connection with the continental plateau.

Thus in the geographical development of the Atlantic coast-lines we may note the following stages :—*First*, in Palæozoic times the formation of great mountain-uplifts, frequently accompanied by volcanic action. *Second*, a prolonged stage of comparative coastal tranquillity, during which the maritime ranges referred to were subject to such excessive erosion that they were planed down to low levels, and in certain areas even submerged. *Third*, renewed elevation (negative or positive) whereby considerable portions of the much denuded Archæan and Palæozoic rocks, now largely covered by younger deposits, were converted into high lands. During this stage not much rock-folding took place, nor were any true mountains of elevation formed parallel to the Atlantic margins. It was otherwise, however, in the Mediterranean and Caribbean depressions, where coastal movements resulted in the formation of enormous linear uplifts. Morever, volcanic action is now and has for a long time been more characteristic of these depressions than of the Atlantic coast-lands.

I must now ask you to take a comprehensive glance at the coast-lines of the Pacific Ocean. In some important respects these offer a striking contrast to those we have been considering. Time will not allow me to enter into detailed description, and I must therefore confine attention to certain salient features. Examining first the shores of the Americas, we find that there are two well-marked regions of fiords and fringing islands—namely, the coasts of Alaska and British Columbia, and of South America from 40° S.L. to Cape Horn. Although these regions may be now extending seawards in places, it is obvious that they have recently been subject to submergence. When the fiords of Alaska and British Columbia existed as land valleys it is probable that a broad land connection obtained between North America and Asia. The whole Pacific coast is margined by mountain-ranges, which in elevation and boldness far exceed those of the Atlantic sea-board. The rocks entering into their formation range in age from Archæan and Palæozoic down to Cainozoic, and they are almost everywhere highly disturbed and flexed. It is not necessary, even if it were possible, to consider the geological history of all those uplifted masses. It is enough for my purpose to note the fact that the coastal ranges of North America and the principal chain of the Andes were all elevated in Tertiary times. It may be remarked further, that from the Mesozoic period down to the present the Pacific borders of America have been the scene of volcanic activity far in excess of what has been experienced on the Atlantic sea-board.

Geographically the Asiatic coasts of the Pacific offer a strong contrast to those of the American borders. The latter, as we have seen, are for the most part not far removed from the edge of the continental plateau. The coasts of the mainland of Asia, on the other hand, retire to a great distance, the true margin of the plateau being marked out by that great chain of islands which extends from Kamchatka south to the

Philippines and New Guinea. The seas lying between those islands and the mainland occupy depressions in the continental plateau. Were that plateau to be lifted up for 6000 or 7000 feet the seas referred to would be enclosed by continuous land, and all the principal islands of the East Indian Archipelago—Sumatra, Java, Celebes, and New Guinea, would become united to themselves as well as to Australia and New Zealand. In short, it is the relatively depressed condition of the continental plateau along the western borders of the Pacific basin that causes the Asiatic coast-lines to differ so strikingly from those of America.

From a geological point of view the differences are less striking than the resemblances. It is true that we have as yet a very imperfect knowledge of the geological structure of Eastern Asia, but we know enough to justify the conclusion that in its main features that region does not differ essentially from Western North America. During Mesozoic and Cainozoic times the sea appears to have overflowed vast tracts of Manchooria and China, and even to have penetrated into what is now the great Desert of Gobi. Subsequent crustal movements revolutionised the geography of all those regions. Great ranges of linear uplifts came into existence, and in these the younger formations, together with the foundations on which they rested, were squeezed into folds and ridged up against the nuclei of Palæozoic and Archæan rocks which had hitherto formed the only dry land. The latest of these grand upheavals are of Tertiary age, and, like those of the Pacific slope of America, they were accompanied by excessive volcanic action. The long chains of islands that flank the shores of Asia we must look upon as a series of partially submerged or partially emerged mountain-ranges, analogous geographically to the coast-ranges of North and Central America, and to the youngest Cordilleras of South America. The presence of numerous active and recently extinct volcanoes, taken in connection with the occurrence of many great depressions which furrow the floor of the sea in the East Indian Archipelago, and the profound depths attained by the Pacific trough along the borders of Japan and the Kurile and Aleutian Islands—all indicate conditions of very considerable instability of the lithosphere. We are not surprised, therefore, to meet with much apparently conflicting evidence of elevation and depression in the coast-lands of Eastern Asia, where in some places the sea would seem to be encroaching, while in other regions it is retreating. In all earthquake-ridden and volcanic areas such irregular coastal changes may be looked for. So extreme are the irregularities of the sea-floor in the area lying between Australia, the Solomon Islands, the New Hebrides, and New Zealand, and so great are the depths attained by many of the depressions, that the margins of the continental plateau are harder to trace here than anywhere else in the world. The bottom of the oceanic trough throughout a large portion of the Southern and Western Pacific is, in fact, traversed by many great mountain ridges, the summits of which approach the surface again and again to form the numerous islets of Polynesia. But notwithstanding the considerable depths that separate Australia from New Zealand there is geological evidence to show that

a land connection formerly linked both to Asia. The continental plateau, therefore, must be held to include New Caledonia and New Zealand. Hence the volcanic islets of the Solomon and New Hebrides groups are related to Australia in the same way as the Liu-kiu, Japanese, and Kurile Islands are to Asia.

Having rapidly sketched the more prominent features of the Pacific coast-lines, we are in a position to realise the remarkable contrast they present to the coast-lines of the Atlantic. The highly folded strata of the Atlantic sea-board are the relics of great mountains of upheaval, the origin of which cannot be assigned to a more recent date than Palæozoic times. During subsequent crustal movements no mountains of corrugated strata were uplifted along the Atlantic margins, the Mesozoic and Cainozoic strata of the coastal regions showing little or no disturbance. It is quite in keeping with all this that volcanic action appears to have been most strongly manifested in Palæozoic times. So many long ages have passed since the upheaval of the Archæan and Palæozoic mountains of the Atlantic sea-board that these heights have everywhere lost the character of true mountains of elevation. Planed down to low levels, partially submerged and covered to some extent by newer formations, they have in many places been again converted into dry lands, forming plateaus—now sorely denuded and cut up into mountains and valleys of erosion. Why the later movements along the borders of the Atlantic basin should not have resulted in the wholesale plication of the younger sedimentary rocks is a question for geologists. It would seem as if the Atlantic margins had reached a stage of comparative stability long before the grand Tertiary uplifts of the Pacific borders had taken place ; for, as we have seen, the Mesozoic and Cainozoic strata of the Atlantic coast-lands show little or no trace of having been subjected to tangential thrusting and crushing. Hence one cannot help suspecting that the retreat of the sea during Mesozoic and Cainozoic ages may have been due rather to subsidence of the oceanic trough and to sedimentation within the continental area than to positive elevation of the land.

Over the Pacific trough, likewise, depression has probably been in progress more or less continuously since Palæozoic times, and this movement alone must have tended to withdraw the sea from the surface of the continental plateau in Asia and America. But by far the most important coastal changes in those regions have been brought about by the crumpling up of the plateau, and the formation of gigantic mountains of upheaval along its margins. From remotest geological periods down almost to the present, the land area has been increased from time to time by the doubling-up and consequent elevation of coastal accumulations and by the eruption of vast masses of volcanic materials. It is this long-continued activity of the plutonic forces within the Pacific area which has caused the coast-lands of that basin to contrast so strongly with those of the Atlantic. The latter are incomparably older than the former—the heights of the Atlantic borders being mountains of denudation of vast geological antiquity, while the coastal ranges of the Pacific slope are creations but of yesterday as it were. It may well be that those Cordilleras and mountain-chains reach a greater height than was ever attained

by any Palæozoic uplifts of the Atlantic borders. But the marked disparity in elevation between the coast-lands of the Pacific and the Atlantic is due chiefly to a profound difference in age. Had the Pacific coast-lands existed for as long a period and suffered as much erosion as the ancient rocks of the Atlantic sea-board, they would now have little elevation to boast of.

The coast-lines of the Indian Ocean are not, upon the whole, far removed from the margin of the continental plateau. The elevation of East Africa for 6000 feet would add only a very narrow belt to the land. This would still leave Madagascar an island, but there are geological reasons for concluding that this island was at a far distant period united to Africa, and it must therefore be considered as forming a portion of the continental plateau. The great depths which now separate it from the mainland are probably due to local subsidence, connected with volcanic action in Madagascar itself and in the Comoro Islands. The southern coasts of Asia, like those of East Africa, approach the edge of the continental plateau, so that an elevation of 6000 feet would make little addition to the land area. With the same amount of upheaval, however, the Malay Peninsula, Sumatra, Java, and West Australia, would become united, but without extending much further seawards. Land connection, as we know, existed in Mesozoic times between Asia, Australia, and New Zealand, but the coast-lines of that distant period must have differed considerably from those that would appear were the regions in question to experience now a general elevation. The Archæan and Palæozoic rocks of the Malay Peninsula and Sumatra are flanked on the side of the Indian Ocean by great volcanic ridges, and by uplifts of Tertiary strata, which continue along the line of the Nicobar and Andaman Islands into Burma. Thus the coast-lines of that section of the Indian Ocean exhibit a geographical development similar to that of the Pacific sea-board. Elsewhere, as in Hindustan, Arabia, and East Africa, the coast-lines appear to have been determined chiefly by regional elevations of the land or subsidence of the oceanic trough in Mesozoic and Cainozoic times, accompanied by the outwelling of enormous floods of lava. Seeing, then, that the Pacific and the Indian Oceans are pre-eminently regions which, down to a recent date, have been subject to great crustal movements and to excessive volcanic action, we may infer that in the development of their coast-lines the sea has played a very subordinate part. The shores, indeed, are largely protected from marine erosion by partially emerged volcanic ridges and by coral islands and reefs, and to a considerable extent also by the sediment which in tropical regions especially is swept down to the coast in great abundance by rains and rivers. Moreover, as the geological structure of these regions assures us, the land would appear seldom to have remained sufficiently long at one level to permit of much destruction by waves and tidal currents.

In fine, then, we arrive at the general conclusion that the coast-lines of the globe are of very unequal age. Those of the Atlantic were determined as far back as Palæozoic times by great mountain uplifts along the margin of the continental plateau. Since the close of that period many crustal oscillations have taken place, but no grand mountain-

ranges have again been ridged up on the Atlantic sea-board. Meanwhile the Palæozoic mountain-chains, as we have seen, have suffered extensive denudation, have been planed down to the sea-level, and even submerged. Subsequently converted into land, wholly or partially as the case may have been, they now present the appearance of plains and plateaus of erosion, often deeply indented by the sea. No true mountains of elevation are met with anywhere in the coast-lands of the Atlantic, while volcanic action has well-nigh ceased. In short, the Atlantic margins have reached a stage of comparative stability. The trough itself, however, is traversed by at least two well-marked banks of upheaval—the great meridional Dolphin Ridge, and the approximately transmeridional Færöe-Icelandic belt—both of them bearing volcanic islands.

But while the coast-lands of the Atlantic proper attained relative stability at an early period, those of the Mediterranean and Caribbean depressions have up to recent times been the scenes of great crustal disturbance. Gigantic mountain-chains were uplifted along their margins at so late a period as the Tertiary, and their shores still witness volcanic activity.

It is upon the margins and within the trough of the Pacific Ocean, however, that subterranean action is now most remarkably developed. The coast-lines of that great basin are everywhere formed of grand uplifts and volcanic ranges, which, broadly speaking, are comparable in age to those of the Mediterranean and Caribbean depressions. Along the north-east margin of the Indian Ocean the coast-lines resemble those of the Pacific, being of like recent age, and similarly marked by the presence of numerous volcanoes. The northern and western shores, however (as in Hindustan, Arabia, and East Africa), have been determined rather by regional elevation or by subsidence of the ocean-floor than by axial uplifts —the chief crustal disturbances dating back to an earlier period than those of the East Indian Archipelago. It is in keeping with this greater age of the western and northern coast-lands of the Indian Ocean that volcanic action is now less strongly manifested in their vicinity.

I have spoken of the comparative stability of the earth's crust within the Atlantic area as being evidenced by the greater age of its coastal ranges and the declining importance of its volcanic phenomena. This relative stability is further shown by the fact that the Atlantic sea-board is not much disturbed by earthquakes. This, of course, is what might have been expected, for earthquakes are most characteristic of volcanic regions and of those areas in which mountain-uplifts of recent geological age occur. Hence the coast-lands of the Pacific and the East Indies, the borders of the Caribbean Sea, the volcanic ridges of the Atlantic basin, the lands of the Mediterranean, the Black Sea, and the Aralo-Caspian depressions, the shores of the Red Sea, and vast tracts of Southern Asia, are the chief earthquake regions of the globe. It may be noted, further, that shocks are not only most frequent but most intense in the neighbourhood of the sea. They appear to originate sometimes in the volcanic ridges and coastal ranges, sometimes under the floor of the sea itself. Now earthquakes, volcanoes, and uplifts are all expressions of the one great fundamental fact that the earth is a cooling and contracting

body, and they indicate the lines of weakness along which the enormous pressures and strains induced by the subsidence of the crust upon its nucleus find relief. We cannot tell why the coast-lands of the Atlantic should have attained at so early a period a stage of relative stability—why no axial uplifts should have been developed along their margins since Palæozoic times. It may be that relief has been found in the wrinkling-up of the floor of the oceanic trough, and consequent formation of the Dolphin Ridge and other great submarine foldings of the crust; and it is possible that the growth of similar great ridges and wrinkles upon the bed of the Pacific may in like manner relieve the coast-lands of that vast ocean, and prevent the formation of younger uplifts along their borders.

I have already remarked that two kinds of elevatory movements of the crust are recognised by geologists—namely, axial and regional uplifts. Some, however, are beginning to doubt, with Professor Suess, whether any vast regional uplifts are possible. Yet the view that would attribute all such apparent elevations of the land to subsidence of the crust under the great oceanic troughs is not without its difficulties. Former sea-margins of very recent geological age occur in all latitudes, and if we are to explain these by sub-oceanic depression, this will compel us to admit, as Suess has remarked, a general lowering of the sea-level of upwards of 1000 feet. But it is difficult to believe that the sea-floor could have subsided to such an extent in recent times. Suess thinks it is much more probable that the high-level beaches of tropical regions are not contemporaneous with those of higher latitudes, and that the phenomena are best explained by his hypothesis of a secular movement of the ocean—the water being, as he contends, alternately heaped up at the equator and the poles. The strand-lines in high latitudes, however, are certainly connected with glaciation in some way not yet understood; and if it cannot be confidently affirmed that they indicate regional movements of the land, the evidence, nevertheless, seems to point in that direction.

In concluding this imperfect outline-sketch of a large subject, I ought perhaps to apologise for having trespassed so much upon the domains of geology. But in doing so I have only followed the example of geologists themselves, whose divagations in territories adjoining their own are naturally not infrequent. From much that I have said, it will be gathered that with regard to the causes of many coastal changes we are still groping in the dark. It seems not unlikely, however, that as light increases we may be compelled to modify the view that all oscillations of the sea-level are due to movements of the lithosphere alone. That is a very heretical suggestion; but that a great deal can be said for it any one will admit after a candid perusal of Suess's monumental work, *Das Antlitz der Erde*.

BRITISH ASSOCIATION, 1892.

THE British Association met this year at Edinburgh, on Wednesday, 3d August, under the Presidency of Sir Archibald Geikie.

The meetings of the Geographical Section were held in the Natural History Class-Room, in the Old University Buildings, under the Presidency of Professor James Geikie, Vice-President of the Royal Scottish Geographical Society.

The Society entertained the Members and Associates of the Association at a Reception held in the Society's Hall, National Portrait Gallery, on the afternoon of 5th August.

The following were the Office-bearers of

SECTION E.—GEOGRAPHY.

President.—Professor James Geikie, D.C.L., LL.D., F.R.S., F.R.S.E., F.G.S., V.-P. R.S.G.S.

Vice-Presidents.—Colonel Godwin Austen, F.R.S.; J. Y. Buchanan, F.R.S.; Dr. George Dawson, C.M.G., F.R.S.; H. J. Mackinder, M.A., F.R.G.S.; E. G. Ravenstein, F.R.G.S., F.S.S.; Baron F. von Richthofen; Coutts Trotter, F.R.G.S.

Secretaries.—J. G. Bartholomew, F.R.S.E., F.R.G.S.; John Coles, F.R.G.S., F.R.A.S.; J. Scott Keltie, Secy. F.R.G.S., F.S.S. (*Recorder*); A. Silva White, F.R.S.E., Secy. R.S.G.S.

Committee.—H.S.H. Albert, Prince of Monaco; J. Theodore Bent; W. T. Blanford, F.R.S.; Sir George F. Bowen, G.C.M.G.; Dr. Alexander Buchan; Dr. Burgess; G. A. Craig; H. O. Forbes; H. N. Dickson; Professor Hull, F.R.S.; James Irvine; General R. Maclagan, R.E., LL.D.; Dr. H. R. Mill; H. Yule Oldham; Admiral Sir Erasmus Ommanney, K.C.B., F.R.S.; Dr. Phené; C. E. Peek; Sir R. Lambert Playfair, K.C.M.G.; Sir Rawson W. Rawson, K.C.M.G., C.B.; Ralph Richardson; Dr. P. L. Sclater, F.R.S.; B. Leigh Smith; G. E. T. Smithson; Eli Sowerbutts; G. J. Symons, F.R.S.; Colonel H. C. B. Tanner; John Thomson; Joseph Thomson; Canon Tristram, F.R.S.; Colonel Sir Charles W. Wilson, K.C.B., F.R.S.

The following is a list of the Papers read before the Section, to some of which brief abstracts of their contents have been given :—

Thursday, 4th August.

1. PRESIDENT'S ADDRESS.

[Published *in extenso*, with illustrative map, in the current number of the *Scottish Geographical Magazine.*]

2. F. W. W. HOWELL.—First Ascent of the Oraefa Jökull, Iceland.

3. JAMES BURGESS, LL.D., C.I.E.—Scottish Place-Names.

4. JOHN THOMSON.—The Effects of Rainfall in the Island of Formosa.

The island of Formosa affords a striking example of the work of rain within a limited area in altering the surface of the land, building up plains seawards, and ultimately fitting them for tillage and the support of an increasing population.

It will be necessary to note the geographical position and configuration of the island, ocean-currents, temperature, and prevailing winds, in order to make the subject intelligible.

Formosa lies between 21° and 25° north latitude, while the 121st degree of east longitude divides it into nearly equal parts from north to south. It is over 200

miles long, and its width varies from five to eighty miles. It is traversed by a spine of lofty mountains throughout its whole length from north to south, having a maximum altitude of 12,000 feet.

It will be seen that, after the rains, the drainage of this chain is necessarily carried over a very small area, and that the changes caused by erosion and the deposit of detritus must be well defined. The Pacific Gulf Stream, known to the Japanese as "Kuroshiwo," flows north on the eastern side, raising the mean temperature of Formosa to about ten degrees higher than that of the mainland. The prevailing winds throughout the year are the north-east and south-west monsoons. The former begins to blow about the end of October and continues on to April.

In its passage across the ocean from the north it is charged with moisture taken up from the warm Gulf Stream, and coming in contact with the lofty mountain barrier of Formosa, it is forced up to a great altitude, where its burden of vapour is liberated by the lighter and colder air. This is discharged over the forest-clad heights in copious rain.

On the eastern side the rain descends through chasms and gorges in torrential streams, and cataracts carry it back to the ocean. The eastern side presents a rocky front to the sea. The denudation of the mountains by erosion and its effects can hardly be traced on this side of the island, as the detritus is deposited in the deep sea adjoining the cliffs. On the west of the central chain, where the gradient is more gentle, we find an extensive plain, part of which has been built up within the historic era by the detritus washed down from the mountains, and the major part in a similar manner during the carboniferous period; as may be gathered from extensive coral islands (and other geological formations) which now form part of the low-lying land redeemed from the bed of the ocean.

But we need go no further back for evidence of the rapid upbuilding of the western plain than the date of the Dutch occupation in 1634.

Two forts were erected—one, Providentia, at the mouth of the Formosa river (Taiwanfu), the other on the island of Taiwan. The former may now be traced within the walls of Taiwanfu, more than five miles inland over the plain, while Taiwan with its fort has long been united to the mainland.

Evidence of how this change has been accomplished exists in the table-lands and spurs of the central range, about fifteen miles inland from Taiwanfu, in the manner in which these lower "no man's lands," so named by the Chinese, are cut up and demolished by the drainage of the lofty chain, chasms cut out by torrents during the rainy season, vast funnel-shaped pits where the land has fallen in undermined by water, broad river-beds cut deep into the table-lands, their banks strewn with rounded and polished boulders of gigantic proportions that have been driven from inaccessible heights and rounded on their downward course to the plain. The greater part of the plain is "an alluvium," a rich loam derived partly from the shales of the central mountains, partly from the sandstones south, and partly from the limestone hills which rise here and there above the level of the lowland. These are the great and small Kangshan, the white bank, Apeshill, Saracenshead, Fingshan: also still more elevated hills inland approaching Baksa Valley; and Lambay island, near Tangkang. We see, thus, within the narrow compass of the island of Formosa rainfall and its results; year by year adding to the habitable plain, and creating extensive shoals between the island and mainland.

Another phase of rain-work in Formosa is the effect which the central mountain range has in withdrawing the moisture from the atmosphere as it sweeps over the island during the north-east monsoon, and conferring on the mainland of

Fukien, Kwangtung, provinces of China, one of the finest winter climates in the world.

5. J. Y. Buchanan, f.r.s.—On the Windings of Rivers.

6. Mrs. Bishop.—Travels in Lesser Tibet. [This paper will be published in a subsequent number of the Society's *Magazine*; it is the paper which Mrs. Bishop read at the second Meeting of the London Branch of the Society.]

Friday, 5th August.

1. H. S. H. Albert, Prince of Monaco.—The Currents of the North Atlantic Ocean.

2. H. S. H. Albert, Prince of Monaco.—Meteorological Observations in the North Atlantic Ocean.

[These two papers will be published in a subsequent number of the Society's *Magazine*.]

3. J. Y. Buchanan, f.r.s.—The Density, Temperature, and Motion of the Waters of the Gulf of Guinea.

4. Hugh R. Mill, d.sc., f.r.s.e.—Physical Geography of the Firth of Forth.

The configuration of the Firths of Forth and Tay and of the neighbouring parts of the North Sea was briefly described, references being given to previous papers bearing on the physical conditions of the water. Since the publication of these papers the results of the observations at fixed stations by the Fishery Board for Scotland have furnished data for a more complete discussion. The new information mainly concerns the rate of increase of transparency in the water from the river seaward, and the effects of tidal action on temperature and salinity. The configuration of the coast and the set of the tides, together with the relative strength of current at springs and neaps and the hour at which these extreme tides occur, explain many apparent anomalies in seasonal change of temperature. In summer estuary water is warmer, in winter colder, than that of the sea, so that, disregarding solar influence, the temperature of the water at a station near the mouth of an estuary is either at a maximum or a minimum at high-water and low-water, the maximum occurring with low-water in summer, with high-water in winter. Apart from this, there is a diurnal range of temperature due to solar heating and cooling by radiation, which in the absence of tides would produce a maximum in the afternoon and a minimum in the early morning. Spring tides recur fortnightly at the same hour, and show the special tidal characteristics in an extreme degree. It so happens that on the east coast of Scotland low-water springs occur in the morning and high-water in the afternoon, and the observations at 9.0h. and 15.0h. accordingly show the resultants of this effect at the maximum. In summer, when low-water occurs in the afternoon, the afternoon temperature at the Abertay lightship is over 1° C. higher than in the morning, and when high-water occurs in the afternoon the temperature is nearly 1° C. lower than in the morning, no matter how strong the solar heating may be.

5. H. N. Dickson, f.r.s.e.—The Need for Teaching in Meteorology.

The selection of subjects for elementary scientific instruction raises several questions concerning the relations of the different branches of physical science to each other. Apart from special applications to arts and manufactures, a want is felt of a subject which shall at the same time afford opportunities of illustrating scientific methods, and give examples of practical value in accounting for many natural phenomena of common observation. The ordinary phenomena of meteoro-

logy, as embodied in the weather folk-lore current everywhere, are already familiar to sailors, fishermen, and farmers, the classes it is most important to reach, and by properly classifying and arranging the facts already known to them several laws may be made to suggest themselves. In this way the meteorological elements, which in this restricted sense underlie a great part of biology, geology, and geography, form an introduction to the fundamental notions of these sciences, as well as to those of physics involved in their discussion.

There is as yet no instruction in meteorology available anywhere in this country, but in view of the rapid development of technical education it is urgent that this should be remedied.

The best method of properly introducing the subject seems to be that the facts of the case should be set before the Technical Education Committees of the County Councils, backed by the approval of the various bodies whose function it is to regulate and extend scientific instruction. In this way a demand for teaching in meteorology would be created, and the supply should come from some of the main fixed centres of technical education, which should not only supply systematic instruction, but should be in a position to deal with questions referring to the relations of meteorology to agriculture, fisheries, etc., and to discuss the data collected by the teachers sent out bearing on local observations and prognostics.

6. Mrs. Grove.—The Desert of Atacama, Chili.

The desert of Atacama spreads over two Chilian provinces, Atacama and Antofagasta. It lies between the Pacific and the Andes, and between the rivers Loa and Copiapo to the North and South. It rises gradually to the Cordillera proper, forming a kind of amphitheatre, in the midst of which are arid plains and vast salt lakes. One of the latter, Lake Ascotan, is quite dried up, and its bed of salt is dotted with a few islands and tepid water puddles called "water-eyes." It is surrounded by high mountains, many of which are volcanic. Above this amphitheatre is the table-land of the Andes, 13,000 feet high, called *Puna*, which word is the origin of the name given to mountain-sickness.

Turning to the industrial history of the desert, we find that it was a terror to all except the conquering Spaniards until the end of the last century; and while the silver mines of Potosi were being successfully worked, the treasures of this region lay unexplored. In 1832 Juan Godoy, a shepherd, found the silver mine of Chanarcillo, and then a legion of courageous and hardy *cateadores* (mine-seekers) laid siege, as it were, to the mountains. The discoveries of silver and copper mines, of nitrates, and borate of lime, followed one another in quick succession, and laid the foundation of great commercial prosperity. The Government gave its countenance and help to the work, sending scientific commissioners and giving security to capitalists.

The great work which requires special notice is the railway from Antofagasta to Uyuni, which is a marvel of engineering skill. It scales a plateau 13,000 feet high, and winds through a desert plain. The whole journey lasts three days, and is not entirely a pleasant experience, as the sun, falling on the white soil, makes a blinding glare, and the heat and thirst are almost unbearable. On the way that strange phenomenon of the desert, the mirage, was seen by the traveller. The plain, which stretches out to the horizon, was dotted over with the graves of the victims of the desert. It is interesting to notice that the soil and the air are such that bodies do not decay in the ground, and the inhabitants are in the habit of removing the corpses of their friends from place to place. At night the cold is intense, the changes of temperature being a great hardship. As the line rises, the

prospect becomes more varied : the road winds round the Limon Verde, and below is the basin of Atacama in the midst of the desert, while all around are the mighty volcanoes, Licancaur, San Pedro, and others. Then the line descends into the valley of the Loa. Halt for the night is made at Calama, "The Queen of the Desert," where the hotel is comfortable on the whole. The journey is continued on the next day past Ascotan, on the edge of the lake, and Cebollar, where there are mines of ice. From Calama another hardship is added to the heat, namely, mountain-sickness, which affects nearly every one. It is caused partly by the diminution of atmospheric pressure, and partly by the dryness of the air, which cuts the face mercilessly. Ollagua is the stopping-place for the second night, and the next evening the arduous journey is completed, and the terminus Uyuni is reached. Here the Bolivian Government intends to build a town, which will be the centre of silver-mining in South America.

7. Colonel Tanner.—Photography as a Means of Surveying.

8. Dr. H. Schlichter.—A New Method for the Determination of Geographical Longitudes by Lunar Distances.

Lunar distances as a means for the strictly accurate determination of geographical longitudes have been little used of late, partly on account of the splendid chronometers with which ships are now provided, and partly owing to the inaccuracies of the instruments commonly employed for lunars. For exploring expeditions on land, however, chronometers are of little value, and the other astronomical phenomena which may be observed, besides lunar distances, are either too difficult for accurate observation by the majority of travellers, or occur too seldom, or are not accurate enough.

The author therefore introduces a new method of observation and measurement of lunar distances, viz., by obtaining a parallel series of photographs of the moon and a fixed star or planet on one plate, and afterwards measuring the distances on the plate. For the elimination of all possible inaccuracies of the photographic film or of the lens, the lunar distances thus registered are checked by repeatedly photographing on the same plate two fixed stars, the positions of which are given in the *Nautical Almanac*, and the angular distance of which can easily be computed therefrom. The angular distances of the photographic lunars are then found by a simple proportion. The time for taking a set of eight photographic lunars on one plate does not exceed three to four minutes, and micrometric measurements show with perfect accuracy the change of the lunar distances (owing to the motion of the moon) during each interval of the eight observations. The minute accuracy of the method is hereby established. The micrometric measurements on the plate are made by means of the same "*réseau*" which is employed by the principal observatories for stellar photography, and the measurements may therefore be regarded as absolutely correct. Results thus obtained give the correct longitude of the place of observation.

The author proposes to use this method for scientific expeditions into the interior of continents, etc., as well as for the further determination and correction of secondary meridians in navigation. For both purposes it is especially adapted on account of its minute accuracy and great simplicity.

Monday, 8th August.

1. Edward Wilkinson.—Two Journeys in the Kalahari Desert.

These notes, which are accompanied by a map, deal with that portion of the Kalahari lying north of a line between Kuis and Honing Vley. The author is inclined to doubt the accuracy of the position of Kuis as given on previous maps,

and the location, if not the existence, of the fork of the Molopo River which is represented on them. The soil of the district appears to be a heavy loose sand, which supports, nevertheless, an abundance of coarse grass, and is densely studded, rather than covered, with low timber and bush. In the few places where water is obtainable, the cattle look well, but the scarcity of water is the curse of the district, and the natives say that it will pass the wit even of white men to find it there. A great portion of the notes is taken up with this question of water-supply, and they contain valuable extracts from a report by Mr. Penning, F.G.S., on that subject. If, as Mr. Penning believes, water in sufficient quantities could be obtained by boring, the author thinks that the country might have a future, in the hands of a powerful company, which could afford to open up waters and use the district as a vast cattle range, but he evidently does not think it can ever be a country for farms of an ordinary size, or for agriculture in any way.

2. Theodore Bent.—Explorations among the Ruins of Zimbabwe.

3. Report of Mr. Bent's Committee.

4. Robert Swan.—The Orientation of the Ruins of Zimbabwe.

The temples in Mashonaland seem all to have been oriented to either the rising or the setting sun at one of the solstices, and in all the less ruinous temples very obvious evidence remains of such orientation in the decoration on the exterior of the walls of these temples. This decoration on the great temple consists of a double band of a chevron pattern, and it extends along the part of wall which is directly opposed to the rays of the rising sun at the midsummer solstice.

Means were provided for marking the time of the occurrence of the solstice, and in the interior of the great temple there is a high monolith which would receive the shadow of another monolith, placed on the wall at the middle of the decoration, when the sun rose at the midsummer solstice.

The great temple at the first glance seems to be roughly elliptical in form, but when carefully measured its walls are found to be built on a number of circular curves of different radii, and the principle governing the length of these radii is interesting. The great tower has a diameter at its base of 17·17 feet (=10 cubits of 20·62 inches), and this length multiplied by the ratio of circumference to diameter (3·14), or by the square of this ratio gives either the radius or the diameter, or half or double of these, of the curves of all the walls of the best period which we have measured in Mashonaland.

Altars were sometimes erected at the centres of these curves, and means were provided for observing from these altars the culminations of stars of the northern hemisphere.

5. J. Buchanan.—The Industrial Geography of Nyasaland.

6. Lieut. H. Crichton-Browne.—Over the Veldt to Lobengula's Capital.

7. Dr. Hallen.—The Hausa Country.

I. In the Western Sudan there are many tribes, but two chief—Hausa and Fellani. Fellani or Fulbe : these are warlike, fanatical, pastoral. The Hausa are brave, but not so fond of war ; not fanatical, but commercial. Where the two come in contact Hausa language predominates.

II. The author gave a sketch outline of Hausa-land, its population, physical geography, meteorology and climate, political economy, nature of people and social economy, slavery (education, towns, etc.), religion.

III. The author then spoke of the work to be done, and of the necessity of studying the Hausa language. He pointed out (1) the commercial importance ; (2) previous work and its shortcomings in this direction ; (3) comparative philology ; (4) dialects ; (5) writing in Arabic characters. He referred to the need of studying

ethnology, customs, history, folk-lore, music, climatology, geology, etc. He then described his proposed method of work under the heads:—(*a*) Preliminary knowledge of Arabic; (*b*) preliminary residence in Tripoli; (*c*) residence in Hausa—where? and methods of drawing the people: (1) personal influence and discussion; (2) medical; (3) non-interference in local politics; (4) educational: (i.) juvenile; (ii.) adult: diffusion of useful books, especially simple illustrated agricultural books, in their own language.

8. Report of Committee on African Meteorology.

I. The work of your committee naturally falls into two branches, viz., *firstly*, the collecting and epitomising of all available series of meteorological observations; and, *secondly*, the exercise of a friendly influence over existing, and the equipment of new, stations, likely to promote a better knowledge of the climatological conditions of Tropical Africa.

II. As regards the first of these objects, your committee have prepared abstracts of the records of sixty-seven stations (including forty-two at which the observations extended over one year). As the places for which there exist records for at least one year number close upon eighty, your committee deemed it advisable to postpone the publication of these abstracts until it shall be possible to present them in a collected form.

Unpublished series of observations have been received by your Committee from Captain Chippendale (Upper Nile, 1874-1875), Rev. C. Paul (Kipo Hill, 1881), Rev. Mr. Wakefield (Ribe, 1886-1887), Rev. G. Smith (Asuan and Wadi Halfa, 1884-1885), Mr. R. S. Hynde (Domasi, 1888-1889), and Captain Gallwey (Benin, 1891).

Your committee are likewise indebted for useful information and printed meteorological records to Captain Capello, Prof. Neumayer, Dr. Tacchini, Prof. Angot, Dr. Etienne, and M. A. Lancaster.

III. As the funds placed at the disposal of your committee are not sufficient for the establishment of independent stations, with paid observers, they are constrained to confine themselves to the distribution of "Instructions" specially adapted for Tropical Africa, and calculated to ensure the trustworthiness and uniformity of the Records, and of blank forms intended to ensure uniformity in the record of observations, and, in a few cases, to the supply of instruments to approved volunteer observers.

The "Instructions" direct observations to be taken either thrice daily (at 9 a.m., 2 p.m., and 7 p.m.), or once daily (at 9 a.m.), as also at two-hourly intervals on certain term-days.

The "Instructions," which are being distributed among all observers stationed in Africa, are to be supplemented, where necessary, by a copy of the "Hints for Observers," issued by the Royal Meteorological Society.

IV. The instruments supplied include, as a rule, four thermometers (max., min., wet and dry bulb), and a five-inch rain-gauge. The thermometers are placed within a galvanised iron cage, which has been specially devised for use in Africa. Additional instruments are to be supplied as may be required and funds permit, as also a standard barometer, where a guarantee can be given for its safe conveyance.

V. Up till now sets of instruments have only been granted to Mr. J. W. Moir (Nyasa) and Captain Gallwey (Benin), but further applications are under consideration.

VI. Your committee have expended £50 out of the £75 granted—and they beg to propose that they be re-appointed, with the addition of Dr. H. R. Mill—and £25 lapsed grant of 1891 and a fresh grant of £25, or £50 in all.

Tuesday, 9th August.

1. E. G. Ravenstein, F.R.G.S.—Professor Penck's proposed Map of the World on a scale of 1 : 1,000,000.

At the recent Geographical Congress of Bern, Dr. Penck proposed the publication of a map of the entire world on a uniform scale of 1 : 1,000,000. This proposition was favourably entertained, and a Committee was appointed to take steps for its realisation. That the scale chosen is the most suitable for the purpose will hardly be doubted by any one practically acquainted with the mapping of the world. To construct such a map on a projection embracing considerable portions of the earth's surface, if not entire continents, would necessarily have led to an amount of distortion quite inadmissible in a map on such a scale. Dr. Penck, therefore, does wisely to accept the method of drawing each sheet on an independent projection, which was first adopted in India, and has subsequently been introduced into Germany, Austria, the United States, and other countries. By this method the separate sheets are nearly equivalent and orthomorphic, the error, for a five-degree sheet under low latitudes, never exceeding 1-1050th. This is less than the error due to the expansion of the paper in the printing-press. Each sheet, up to 60° N., would embrace five degrees in each direction ; the more northern sheets would embrace ten degrees of longitude each. The representation of the whole earth, including the sea, would require 936 of these sheets, whilst the land alone could be shown on 769 sheets.

Physical and political features are to be adequately considered. Rivers are to be in blue, hills in brown. Contours are to be drawn at 100, 300, 500, and 1200 metres, and the areas enclosed by them, which Dr. Penck assumes to be equivalent, are to be tinted. Those sheets which deal with countries already surveyed would be engraved on copper ; the remaining sheets might be lithographed.

The Greenwich meridian is proposed for acceptance, but all altitudes are to be in metres. The official spelling of all countries using the Latin alphabet is to be retained, even in their "spheres of influence." Other alphabets are to be transliterated in accordance with a system to be agreed upon, whilst names in unwritten languages will be spelt phonetically.

Dr. Penck estimates the cost of an edition of 1000 copies of this map (land-surface only) at £191,438, and as the sale of this edition at 2s. a sheet would produce only £88,000, the deficit of £103,438 would have to be made up by the governments concerned, or by liberal private patrons.

There is nothing Utopian about the scheme, so far as I can see. Difficulties may arise as to the spelling of the names, or the introduction of the metre, but the essential thing, to my mind, is the production of a map on an uniform scale. If it be borne in mind that twenty-five 5-degree sheets of such a map of Africa were, some years ago, published by me, with the help of the Royal Geographical Society, and that 21 sheets of the same map are now in course of preparation, and that all this was done by myself unaided, it must be admitted that better and speedier results might be brought about by organised co-operation.

2. Walter Harris.—A Recent Visit to Yemen.

Mr. Walter B. Harris' paper on Yemen deals with a journey undertaken by him in the early months of this year, and during the rebellion of the Arabs against the Turks. Mr. Harris started from Aden early in January without guards, and accompanied only by one of his trusted Morocco servants and a guide, all three mounted on camels. Passing through Lahej, Mr. Harris continued his journey

over the desert until, after issuing from the mountain gorges of Khoreiba, he reached Kateba, the Turkish frontier town, and by means of a disguise, succeeded in obtaining a permit to pass into Turkish territory. From Kateba to Yerim the journey was a very dangerous one, and the travelling was nearly all accomplished by night, the day being spent in hiding in the jungle. From Yerim the journey was continued to Dhamar, and thus to Sana, the capital. Mr. Harris having taken nineteen days in accomplishing the distance—nearly three hundred miles.

On his arrival at Sana he was seized by the Turkish authorities and thrown into prison, where, owing to the unhealthy state of the place and the bad water supplied to him, he was taken ill with fever. On the fifth day of his imprisonment he was sent away to Hodeidah on the Red Sea coast under an escort of Turkish soldiers, the journey occupying about five days, the distance being something under two hundred miles. Mr. Harris passed through much wonderfully beautiful scenery, and has brought back an account of Arabia Felix which entirely belies one's ideas of that country. By most people Arabia is supposed to be a desert, but Mr. Harris has found that Yemen at least is a country of magnificent fertility, the great plateau, lying at an elevation of from seven to nine thousand feet above the sea-level, being in a state of excellent cultivation. Water is by no means scarce ; in fact, in many places there are rivers of no inconsiderable size. Although the journey has been made once or twice before, Mr. Harris is probably the first European who has reached Sana from Aden. After much hard travelling, several narrow escapes, four days' imprisonment in a Turkish gaol, and a violent attack of fever, Mr. Harris reached Aden towards the end of February with a considerable number of photographs and a large collection of notes and sketches pertaining to a country of which but very little is known. An account of the rebellion was by contributed him to the *Times*, and published on April 23. At any time the journey would not be an easy one, and, considering that the country was in a state of revolt, Mr. Harris had to overcome very many difficulties before reaching Sana.

3. H. O. Forbes.—A Recent Visit to the Chatham Islands, and some points in connection with Geographical Distribution.

4. Coutts Trotter.—Recent Explorations in New Guinea.

5. W. R. D. Beckett.—The Eastern Laos States of Siam in the Mekong Valley. [This paper will be published in a subsequent number of the Society's *Magazine*.]

6. H. Yule Oldham.—Cadamosto and Early Exploration in Western Africa.

Alvise da Cadamosto, born at Venice in 1432, entered, like Columbus and other Italians, the service of Portugal, and, at the instigation of Prince Henry, the Navigator, made two voyages along the west coast of Africa in the years 1455 and 1456. In the second of these the Cape Verd Islands were discovered for the first time. The journals of these voyages form one of the earliest personal narratives of an explorer, and are of particular value as a connecting link between the periods of Prince Henry and Columbus, the two great figures in the history of geographical discovery in the fifteenth century.

As the trustworthiness of Cadamosto has been seriously impugned, the object of the paper is not merely to draw attention to the merits, but to vindicate the character, of this important traveller.

7. W. J. Campbell.—A Recent Journey in Northern Corea. [This paper will be published in a subsequent number of the Society's *Magazine*.]

8. Professor Schoute.—On a new Project for Drying up the Zuider Zee.

Grants for Scientific Purposes.

The following were the grants awarded to Section E (Geography) : —

1. Exploration of the Karakorum Mountains, £50.
2. Scottish Place-Names (R.S.G.S), £10.
3. Climatology and Hydrography of Tropical Africa, £50.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Resignation of the Secretary.

At a Meeting of the Council, held on 25th July, Mr. Silva White submitted his resignation as Secretary and Editor to the Society. He explained that, in consequence of the state of his health, he found it necessary, not only to spend next winter abroad, but also to select a milder climate than Edinburgh as a permanent residence. Whilst expressing his regret at the necessity of this step, he cordially thanked the Council, the Honorary Officials, and the Standing Committees of the Society and its Branches for the constant support and encouragement all had given to him in the performance of his duties. He also expressed his indebtedness to the permanent staff of the Society.

The Council, in accepting Mr. Silva White's resignation, cordially passed the following Resolution, on the motion of Mr. John Cowan of Beeslack (Vice-President), seconded by Mr. Ralph Richardson (Senior Honorary Secretary) :—

"The Council receive with deep regret the intimation by Mr. Silva White of the resignation of his Office as Acting Secretary. They record their appreciation of his zeal and their high estimation of his important services. They believe that to Mr. White, whose term of office dates almost from the institution of the Society, the success and present prosperity of the Society and of its *Magazine* are largely due. The Council sympathise with Mr. White in the state of his health, which has constrained him to seek a change of climate ; and they earnestly hope that he may be at an early period restored to perfect health."

The post of Secretary and Editor to the Society will, in consequence, be refilled on 31st October, the last day of the current Session.

Reception to the British Association.

The President and Council of the Society entertained the Members and Associates of the British Association, on the occasion of their visit to Edinburgh, at a Reception in the Society's Hall on the afternoon of 5th August. The National Portrait Gallery and the National Museum of Antiquities, in the same building, were, by the courtesy of the authorities, thrown open to the Society's guests, who were received in the Library by Professor James Geikie (Vice-President) and Members of Council of the Society.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A.,

Assistant Librarian, R.S.G.S.

EUROPE.

Limit of Trees in the Peninsula of Kola.—The latest explorations of the Finnish expedition have thrown much light on this subject. The northern limit of conifers is a winding line which traverses the peninsula from north-west to south-east. But birches extend still further northwards, and form an outer zone, the edge of which is very irregular, extending along the valleys quite down to the coast, so that only a small strip is occupied by *tundras*, and even these are frequently interrupted by groves of birch. In connection with the *tundras* of the interior, the explorers state that the treeless tracts on the Ponoi are not *tundras*, but extensive swamps, the vegetation of which belongs to the forest region. Arctic or *tundra* vegetation is confined to the narrow coastal zone and a few elevated points in the interior.—*Globus* No. 6.

ASIA.

Russian Scientific Expeditions.—Several departments and institutions are engaged this year in investigating the natural resources of the Russian Empire. The Caucasian Department of Mines will continue its inquiries into the mineral springs of Transcaucasia, and will investigate the geological formation of the Tiflis Government and of the valleys of the Alazan and its tributary the Iora in Kakhetia, where petroleum, Glauber's salts, copper, and bismuth abound—a work of great importance in relation to the projected railway into this district. The occurrence of petroleum and nickel in the Caspian Sea district and in Daghestan is also to receive further attention. Petroleum is also found along the route of the new branch of the Vladikavkaz railway, though it was not worked until a report of the intended railway spread abroad. Three engineers are commissioned to search the country along the route of the Siberian railway for water, coal, and building materials, and also to explore the mining districts of Tomsk and Akmolinsk and of the southern part of the Government of the Yenisei. Professor Dokutchayeff is to examine the soils of the Ussuri district with a view to the publication of a popular guide for colonists, indicating the best methods of raising various crops and the conditions necessary for their success.

The Ministry of Public Instruction has decreed the establishment of a biological station on the island of Solovetski, in the White Sea, and the director of the Imperial Botanical Garden is sending out a young botanist to study the flora of the Sayansk mountains.

A large expedition has been equipped by the Riazan-Uralsk Railway Company for a survey of the Kirghiz steppe, the intention of the Company being to construct a line from Uralsk to the Amu-Daria, and establish regular means of communication along the river. The expedition will consist of three parties, of which one will undertake geographical and geological work on the Ust-Urt plateau, the second will collect statistical data relating to the economy of the country, and the third will proceed to the Amu-Daria, occupying itself chiefly with the questions of the possibility of navigating the river against the current and the accessibility of its different mouths.

A syndicate of Moscow merchants is making inquiries about the rich sulphur deposits in the district of Krasnoiarsk and at Shiikh, about 110 miles north of

Askabad. A favourable result is to be hoped for in the interests of Russia, which now imports the greater part of the 26,280 tons it consumes.—*Globus*, Bd. LXII. No. 2.

Russian Surveys.—In 1891 the Russian military topographists mapped out 15,415 square miles of country, of which 412 lie in the Syr Daria and Ferghana territories, and about 4050 in that of Samarkand. The maps drawn from the observations of Captain Grombtchevski embrace an area of 9559 square miles, and represent the central plateaus in the Alaï mountains, the Pamir, part of Tibet, Kashgaria, etc.—*Boll. della Soc. Geogr. Italiana*, Fasc. vi.

Urban Population of India.—In India, with its population of 288 millions, there are only 2035 towns, and their inhabitants form only 9½ per cent. of the whole population. Baroda comes first in respect of its urban population, 20 per cent. of the people living in towns. Then follow the Bombay Presidency, with 19½ per cent., and the Bombay Native States with 14·6 per cent. In Assam and the small Native States of Bengal there is scarcely any urban population, properly speaking, for the places classed among towns are little more than local markets. As a whole the growth of the urban population has been fairly uniform with that of the country at large. During the past decade the increase has been 9·4 per cent. The smallest towns, of under 5000 inhabitants, show only a nominal increase. In the larger towns the males have increased in a greater ratio than the females. In 1881 there were 798 women to 1000 men, and in 1891 only 707. The proportion for the whole of India is 958 to 1000.

It is not easy to compare Bombay and Calcutta, for the former has clearly defined limits, while the latter is surrounded by suburbs under distinct municipal constitutions. The population of Bombay is 821,760, and of Calcutta, with its two immediate suburbs, 741,140, but with all the surrounding suburbs it reaches a total of 978,370. Madras comes next with 452,520; Hyderabad has 415,000, Lucknow 273,030, and Benares 219,470. There are twenty-two other cities with populations of 100,000 or more, and forty-eight towns of 50,000 to 100,000 inhabitants. As instances of rapid increase may be mentioned Karachi, 43 per cent.; Rangoon, 34·4 per cent.; and Cawnpore, 24·6 per cent. Of the large towns only Patna, Amritsar, Surat, and Mirzapur have not increased since 1881.—*The Times*, July 11.

Indian Railways.—The *Administration Report* for 1891-92 states that, during the year ending March 31st, 1892, 677¾ miles were added to the lines open to traffic, of which 65¼ were of standard gauge, and 612½ of mètre gauge. The total length of railway open on the same date was 17,564 miles, of which 10,103¾ were of standard gauge, 7171¾ of mètre gauge, and 288½ of special gauges. During the year sanction was given to the construction of 1697 additional miles. Excluding the traffic on lines of special gauge, the total quantity of general merchandise carried in 1891 was 16,785,624 tons, or 20·56 per cent. more than in 1890, while the freight received showed an increase of 20·5 per cent. The increase was mainly due to larger exports of wheat and seeds from Calcutta, Bombay and Karachi. The total number of passengers carried on all the lines was 122,855,337, or 8,773,091 more than in the previous year. The net loss to the State in the year 1891-92 will probably be about 6 *lakhs* of rupees against 17¼ in the preceding twelve months, omitting contributions to sinking funds for the redemption of capital invested in annuities. Were interest on lines under construction omitted, the gains and losses of the State from the working of the entire railway system in 1890-91 would about balance, and in 1891-92 the results would show a net gain of 19 *lakhs* of rupees (about £130,600).

The Eruption at Sangir.—This island, more commonly called by the natives Great Sangir, is the largest of the chain of volcanic islands which connects the northern peninsula of Celebes with the southern point of Mindanao, and is distant 130 miles from the former island. Mr. Sydney J. Hickson, of Downing College, Cambridge, has given a description of this and the neighbouring islands in *A Naturalist in North Celebes*, and, lately, in *The Times* of July 7th, has published a letter on the former eruptions that have devastated them. These islands rise very abruptly from the sea bottom—a depth of over 2000 fathoms having been sounded by the *Challenger* close to Great Sangir. They are very mountainous, and are clothed with dense tropical forests. Ruang and Siauw are little more than volcanoes rising out of the sea; but Sangir is a large island, 25 miles long by about 15 broad; in the southern half its surface is founded of undulating valleys and hills, while the great Awu volcano and its slopes occupy the greater part of its northern half. Mr. Hickson visited the islands in 1885, when the Ruang and the Awu were quiet, but the Siauw was emitting dense volumes of smoke. It would seem, however, from the records of the islands found in Dutch books of travel, that Siauw has never exhibited any violent and destructive activity, whereas the history of the other two is full of the most terrible episodes. The last serious eruption of the Ruang took place in 1871, when 400 persons lost their lives. In 1711 a terrible eruption of Awu occurred, bringing destruction to more than 2000 people of the kingdom of Kandahar. A large lake was then formed in the crater, and Sangirese of a certain privileged class were allowed to visit it every three or four months for the purpose of testing the water. If it were hot enough to cook rice an eruption was expected. In 1856 the waters of the lake began to boil, burst their banks, and rushed down the mountain to Tabukan and Taruna, causing great destruction of life and property. Once more the Awu has burst into activity, destroying, according to an official telegram received at the Hague on July 22nd, the whole of the north-western portion of the island, and killing 2000 persons. In the other parts of the island the crops have suffered terribly, and other damage has been done. The population consists of a Dutch Controlleur, three or four German missionaries and their wives, one or two European traders, a few Chinamen, and about 12,000 Malays. It is said that no Europeans have been killed.

AFRICA.

Morocco.—Last year M. de la Martinière crossed the Great Atlas into the valley of Sus, where he found semi-barbarous people, who spoke Tamazirt, and knew only the most elementary principles of Mohammedanism. Thence he travelled to the fanatical town of Tarudant, a wretched place, now containing only 4000 to 5000 inhabitants, which has never before been visited by a European. He then proceeded to the north-west for the purpose of examining the sites of the ancient towns of Lixus and Volubilis.

Trade with Morocco.—Statements having been made that British trade with Morocco was declining, Sir C. Euan-Smith has caused the question to be investigated by the British Consuls (*The Times*, July 19th). The results of their inquiries have now been published as a trade report. All the Consuls agree that there has been no falling-off, but that Great Britain has shared in the general advance of European commerce with Morocco. There has, however, been an important change in the carrying trade during the years 1886-90. There is a tendency to direct trade in preference to the Gibraltar route, and there has been a large increase in the number of German and Spanish vessels calling at Moorish ports. Consequently, many goods that formerly passed through London are now sent direct by

German steamers, while Spanish vessels, besides the exports of their own country, carry a quantity of Manchester goods, which, it seems, can be transported through Cadiz at a cheaper rate of freight than through Gibraltar. These goods are registered as imports from the country whence the vessel bringing them sailed, and to this circumstance is due the apparent decline of British imports. Cottons, tea, and candles are sent from Great Britain, and in the report it is suggested that British manufacturers should produce clothes suitable to the Morocco trade—of inferior quality, but with a glossy surface, and of bright colours.

At the port of Mogador the value of the imports in 1891 was £353,552, or nearly double that of 1890, and the greater part of this large increase relates to British trade. The French Consul, in the *Rapports Commerciaux*, No. 14, suspects the accuracy of the returns. It is certainly singular that there should be such a large increase of imports when the total tonnage of vessels calling at the port has decreased, and the explanation cannot, of course, be sought in a rise in prices. The French Consul states that unusual drought during the winter 1890-91, and an invasion of locusts, caused a deficiency in articles of export, wherefore the Jewish merchants, who have almost a monopoly of the trade of Mogador, have had to deal more largely in imports. These they obtain on credit, and having overstocked the market, they have been obliged to sell at a loss. There is, therefore, great cause for fearing that they may not be able to meet their obligations.

The River Lulu.—M. Chaltin, Commissioner for the Aruwimi district, has made a reconnaisance of the country lying between that river and the Wellé, and has fully explored the lower course of the Lulu, a tributary of the Aruwimi. Of all the rivers which traverse the virgin forests of Central Africa the Lulu has the most capricious course. Its windings are numerous, its contractions and expansions are most unexpected, and its current is rapid. Though flowing over a sandy bottom, its waters have a dark tinge. Its low and marshy banks, inundated when the water is high, are clothed with tall trees interlaced with parasitic and climbing plants, and its bed is bestrewn with pretty little islands. The Lulu is deep, but nevertheless navigation is difficult and dangerous, for the bed is crowded with dead trees, and above Bakangolia the passage is often barred by fallen trunks extending from bank to bank. At the confluence with the Aruwimi the Lulu has a depth of 6½ feet, while at Bokondadu the water deepens to nearly 20 feet, becoming shallower again at Bakangolia, where it is 13 feet deep. The banks are uninhabited, except at the few points where villages are built. Near the mouth the villages contain only fifty to one hundred inhabitants, but Bokondadu and Bakangolia are fine villages, with large populations. The latter is situated on both banks of the river, and is surrounded by a number of less important hamlets. The people build very neat houses of clay, which they adorn externally with quaint designs in red, yellow, black, and white. Further up, between Bakangolia and the pretty little village of Mapalma, is a wretched settlement named Makongo, where not a banana is to be seen nor a plant of manioc or maize. There are no huts, but a few palm leaves thrust into the ground and fashioned into a kind of dome is the only shelter employed. The riverain natives of the Lulu are fishers and agriculturists ; they spend little time in hunting, though the surrounding forests abound in game. The day is not far distant when the aborigines will be supplanted by the Banjandes, a warlike race from the north, who lead a nomad life, and subsist on the products of the chase. They are faithful allies of the Congo State, and furnish excellent soldiers.

At Mapalma Lieutenant Chaltin left the banks of the Lulu and marched in a north-westerly direction along a broad route through country well stocked with

elephants, antelopes, and wild boars, crossing the Makusere and Gunu, tributaries of the Lulu. The village of Bassili stands on the Tele, another tributary of the same river, which is 30 to 55 yards broad, with a depth of 10 to 16 feet, and though obstructed by fallen trunks, is easily navigable through its entire course. At two days' march from Bassili the route is crossed by the Emme and Kauba, affluents of the Rubi. They are broad and deep, but not navigable. At Bobi the Rubi itself was struck: it has here a breadth of 80 to 100 yards, and a depth of 16 feet. Three days' march up-stream large falls are said to exist. M. Chaltin passed through a succession of pretty villages between Bobi and Majoropa, and pushed on as far as Woma, which is situated at a distance of only three days' march from the Wellé. Between Bakangolia and Majoropa the houses are all built in the form of kiosks, and the villages protected by palissades and abatis. Majoropa is a large village of 300 inhabitants, and is the most important centre in the country.—*Le Mouvement Géogr.*, No. 14.

A New Lake in Central Africa.—On his march from Kilimanjaro to the Victoria Nyanza, Dr. Baumann first explored Lake Manyara, which he found to have an average breadth of 19 miles, and a length of 74½ miles. Its water is briny, and saline deposits occur on its shores. Passing from the northern extremity of the lake along its eastern shore through Umbugwe (Umbugwe is on the west ?), a country rich in cattle and asses, and peopled by a fine muscular race, Dr. Baumann rounded the southern end, and ascended northwards to Ngorongoro to the west of Lake Natron, where a small lake was discovered. On March 21st he turned westward, and on the 23d was surprised to find himself on the banks of a large sheet of water, Lake Eiazi. He skirted the northern shore, from which he was unable to perceive the southern extremity. The Masai reported that the lake extends to the Iramba country, in which case it must be over 90 miles long. Its breadth in the northern part is 18 to 30 miles. The Masai travel along the eastern shore, for on the western they would have to cross a river called Uslekuma. This is probably the Wembare, the outlet of which has not yet been discovered. On March 29th the expedition passed a small salt lake, the Lgarria, and on April 12th sighted the Victoria Nyanza from the plateau of Kitoto. All the country traversed is inhabited, except a long belt which took twenty days to cross. Water is abundant. The climate is very healthy, the temperature being too cold rather than too warm.—*Le Mouvement Géogr.*, No. 15.

AMERICA.

Texas.—The climatology of this State is fully dealt with in a report by the Chief Signal Officer, which contains some information likely to interest many readers in this country. The total area of Texas is 265,780 square miles, and it extends from 25° 30′ to 36° 30′ N. lat., possessing, consequently, a great diversity of climate. This is also due to great differences of elevation, about one-eighth of the State lying at an elevation of 3000 feet above the level of the sea, and considerable areas at over 6000 feet. In general, however, Texas may be said to be a prairie country rising very gently from the Gulf of Mexico to the 3000 feet contour line. Within its limits are large tracts where snow and ice are practically unknown, and others where prolonged and severe north winds are accompanied by very low temperature—far below zero. As regards rainfall, considerable sections have less than an inch a month, and therefore belong to the arid regions, while other localities have more than an inch a week; also the rainfall is very unevenly distributed through the year. The diversity of climate may best be shown by stating that apples and olives, cotton and hay, find congenial habitats. In the interior the

dryness of the air promotes rapid radiation in winter and insolation in summer, whereas diametrically opposite conditions obtain in the coastal region; but the physical configuration of the country facilitates the passage of the moist Gulf winds northward and of the cold waves of winter southward, so that neither the marine climate of the coast nor the continental climate of the interior prevails in full force. It appears that Texas is unusually free from tornadoes. The report from which this note is taken contains a large number of meteorological tables and charts.

In the last appendix the agricultural capabilities are described by Sergeant Cline, of the Signal Service. He estimates that there are over a million acres in South Texas on which sugar might profitably be grown. On the abolition of slavery many plantations were abandoned for want of capital, and this industry has been revived only within the last few years. Wheat-growing is still in its infancy. In the north-west there is a large territory which promises to become a most important wheat-growing district, and suitable lands exist in the Pan Handle (a local term applied to the district on the northern side of the 35th parallel); but whether the rainfall in the latter country is sufficient has still to be ascertained. The western portion of the State is adapted for viticulture; rice might be grown along the coast; and fruit is a promising crop in all parts, and its cultivation is being extended. Besides these there is a large number of other cultivated plants which thrive in one or other parts of the State. The climate is generally salubrious; the section west of the 98th meridian and north of the 30th parallel is a suitable residence for invalids suffering from pulmonary complaints, while the coast and the south-western districts offer unsurpassed advantages as winter health resorts. Several mineral springs are gaining in popularity, among which may be named Lampasas Springs and Wooten Wells.

Mexican Trade.—This country contains great mineral resources, has a population of not less than twelve millions, and is comparatively near to the largest centres of exchange in the world. It is, therefore, surprising, as the *Moniteur Officiel du Commerce* (July 28th) remarks, to find that its external trade is relatively small, and that the railways which now intersect the country have not produced the progress that might have been anticipated. This tardiness of development is due partly to the character of the native inhabitants, three-fourths of whom are Indians and half-castes, ignorant and obstinate in their adherence to their primitive customs. The Mexicans have neither the capacity of assimilation nor the spirit of enterprise characteristic of the populations of the more prominent South American republics. Accordingly, all the great economic reforms carried out during the last fifteen years are due almost exclusively to the action of the Government, assisted by foreign capital and energy. Another chief obstacle to progress is the want of credit. Usury is common, and nearly all classes borrow at exorbitant rates, but a sound credit system which would facilitate commerce and foster industry is wanting. The French, in whose hands is the trade in woven materials, find it necessary to give credit to the country dealers, but the risk is so great that they are obliged to charge a high rate of interest—sometimes as much as one per cent. per month. The banks merely receive money on deposit, and do not discount commercial bills, nor, except in rare instances, lend money to Mexicans for trading purposes. Two banks only have the privilege of issuing notes, the National Bank of Mexico and the Bank of London, Mexico, and South America, and the former charges a discount on the notes of its own branches. The few banks which do business in Mexico, though with great restrictions, reap a rich harvest, and foreign capital might be safely and usefully applied, the writer in the *Moniteur* thinks, to the extension of the credit system. The benefit to the country cannot be called in

question, and probably, if the natives acquired the habit of paying the interest regularly and punctually, the necessary funds would be forthcoming.

British Honduras.—The Administrator, Mr. G. W. Melville, states in his report for 1890 that the Colony has prospered materially, and the character and condition of the majority of the inhabitants are all that can be desired. On the other hand, tropical fevers have, unfortunately, been unusually prevalent. There is no poverty in the Colony; any man or woman can obtain good wages or support himself comfortably by fishing or cultivation. There is a slight but constant influx from the adjoining States, but, otherwise, there is very little immigration. An accession of colonists from the West Indies would be a great gain. Few, however, care to cross over from the islands to British Honduras, because they cannot return except through the United States, no steamers or sailing-vessels making the voyage direct. Wages are high, and the uncertainty of the supply of labour causes much trouble and inconvenience to employers. Labourers frequently break their agreements, and engage themselves to two or three employers at once to get an advance from each.—*The South American Journal*, July 16.

The West Indies.—In the *Quarterly Journal of the Geological Society*, No. 190, is a report by Mr. Jukes-Browne and Professor Harrison on the geology of Barbadoes, which is of special interest as furnishing evidence of a deep submergence of the whole Caribbean region during the Pliocene period. Radiolarian earths have been found not only in Barbadoes, on the threshold of this region, but also in Jamaica and Cuba. At the present time no Radiolarian ooze is found on the floor of the Caribbean Sea, though the greater part of it is over 2000 fathoms deep. The deposit now accumulating is a Globigerina ooze of a reddish-brown tint, and in shallower waters a white Pteropod ooze is the usual deposit. Both often contain *Radiolaria*, but in small numbers. As regards the amount of upheaval, the authors express their opinion that the oceanic deposits of Barbadoes were formed at a depth of 2000 to 3000 fathoms, and that the Pliocene limestones of Jamaica, now raised 2000 to 3000 feet above sea-level, may have been formed at a depth of 400 to 500 fathoms, whence they infer an upheaval of 800 to 1000 fathoms. Professor Sollas, in the discussion which followed the reading of the paper before the Society, remarked that it could no longer be accepted as an assured fact that deep-sea deposits never enter into the composition of land-masses. He considered, however, that the excessive depths claimed by the authors were not fully established by the evidence adduced, striking exceptions to the general rules regarding the habitat of marine organisms being frequently met with.

AUSTRALASIA.

British New Guinea.—Sir William MacGregor, Hon. Fellow of our Society, has kindly forwarded to us a copy of a *Despatch*, in which he relates the incidents of a tour of inspection to the eastern portion of the possession in January last. In an accompanying letter he calls especial attention to the islands of Kitava, Kwaiawata, and Gawa, and adds:—'These are of a structure that is, so far as I know, quite unique. I am curious to know whether any similar islands are known to members of the Society.' The first of these three islands, Kitava, lies, as may be gathered from the *Despatch*, off the west coast of Kiriwina, the largest of the Trobriand group. Kitava is the name by which the island is known in Kiriwina, but its inhabitants call it Nowau. Sir W. MacGregor describes it as follows:—'In area it may be five or six square miles. Nearly all round it presents a low and slightly sloping margin to the sea, generally about a quarter of a mile broad, covered by heavy timber; but at places this low border has been more or less

worn away. Beyond it, on the inner side, begins a precipitous coral wall, which is accessible at only a few places, and even at those the path is not an easy one. This precipitous bank rises to a height of 300 to 400 feet. It is all covered by forest. Once at the top one begins to descend from 50 to 100 feet into a plateau, which occupies the whole of the centre of the island. In that plateau the people live and have all their gardens. It is slightly undulating, has a rich chocolate soil, and is completely protected from wind all round by the rocky rim. It seems to have a good rainfall, and is extremely fertile. The surrounding wall is evidently of coral, the shells in which point to a not very remote origin. The island would therefore seem to be a raised atoll. As the people all live in the centre of the island, a vessel might pass there without seeing a single person, and might leave with the impression that it is uninhabited. They have a few sailing canoes and some smaller ones for fishing purposes. We landed on the south side of the island, where Manaiéa, the principal chief, keeps his canoe, and whence there is a path to the interior. At the landing we found a canoe from Kwaiawata Island, which had come to Kitava to buy yams. There are thirteen villages on the island, of which I visited six. In each of these there were over twenty houses. The population of the island is probably from 1000 to 1200. As a rule, their houses are fairly good ; the village sites are old, surrounded by a clump of cocoa-nut trees, and the food gardens are extensive and flourishing. In character the people approach those of Kiriwina. It was difficult to travel through some of the villages, over the yams, cocoa-nuts, *Pandanus*, mats, etc. laid down before one for one's acceptance. There do not seem to be any intertribal hostilities on the island, and it would be difficult for any other people to oppress them. It would not be easy to imagine a more pleasant residence. The drainage of the central plateau is excellent. One could see the great cavities in the surrounding coral wall or in the coral subsoil into which rain-water falls. This filters through the rock and finds its way to the sea. Fresh water was thus found for the steamer by making a hole in the sand near the beach opposite our anchorage. Some ebony wood grows on the island, and many of these people show considerable skill in carving lime spoons, clubs, mortars for crushing the betel-nuts, etc. Carving wood and trading are their two favourite occupations. As in some other parts of the Possession, widows wear the ornamented lower jaw of the deceased husband as a pendant, and widowers wear the seventh or first cervical vertebra of the deceased wife tied into the hair behind. Both sexes also wear on the neck the teeth of the deceased.' Kwaiawata and Gawa are of considerable importance from their position in the track between Kiriwina and Murua. Kwaiawata is a mile and a half to two miles in diameter, and is of the same form and structure as Kitava. There are thirteen villages on the plateau, containing a total population of 400 or 500. Gawa is larger than Kwaiawata, its central plateau being at least two miles in diameter. It has preserved the atoll form more perfectly than the other two islands. The coral wall rises to the height of about 400 feet, and is very steep ; part of it had to be ascended by a ladder. The population cannot be less than 500. The inhabitants of these islands are, Sir William MacGregor believes, Papuans, but physically and intellectually they are distinctly superior to the tribes of the D'Entrecasteaux group or of the north-east coast.

MISCELLANEOUS.

Lieut.-Colonel Grombtchevsky is preparing to start on another expedition into Central Asia.

The **Railway** from Jaffa to **Jerusalem**, 45 miles long, is completed. The trade of Jaffa is rapidly increasing, and when the new harbour works, so long projected, are constructed, this port will be a formidable rival to Beirut.

A **shower of volcanic ash** has lately occurred in several parts of Finland, the ground in some places being covered to the depth of a finger. It is not the first time that such a shower has been experienced. Volcanic eruptions in Iceland are assigned as the cause.

The editor of *Petermanns Mitt.* makes known in Heft 7 the discovery that **Ceyp's Narrative**, noticed in the July number of the *Magazine*, is nothing but an accurate transcript of the travel sketches of Gasteiger Khan, which appeared at Innsbruck in 1881 as a reprint from the *Bote für Tirol und Vorarlberg*.

A singular and at present unexplained phenomenon is observed near Koberbrunn in the district of Sprottau, Silesia. A hollow about 2600 acres in extent is **converted into a lake** at intervals of about 30 years. Now again the hollow is about half-full and the water is still rising.—*Deutsche Rundschau*, Heft 11.

The Emperor Alexander, by a *ukase* published in Astrakhan on June 19th, has **freed the Kalmucks** of that Government from serfdom. They are Buddhists, and number 150,000 souls. In 1861, when the other Russian serfs were freed, the Kalmucks were not included among those that benefited by the law, for it was thought that so wild a people would abuse their privileges.

The **Lake of Neusiedl**, which has several times been dried up, has during the last two years lost half of its water, and is now nowhere much more than three feet deep. This happens, fortunately, just when the Hungarian Government has resolved to drain off the water into the Raab. The ground is not swampy, and can be used at once for agricultural purposes.—*Deutsche Rundschau*, Heft 6.

Since 1890 M. J. Renaud, a naval engineer, has carried out observations on the **currents of the Straits of Dover**. He finds that there is no under-current as at Gibraltar, but that the whole volume of water, from the surface to the bottom, moves alternately towards the North Sea and the British Channel, as influenced by the changes of level produced by the tides.—*Annales de Géographie*, No. 4.

Dr. W. Sievers has been asked by the Hamburg Geographical Society to continue the exploration of **Venezuela**. On June 2nd, he stated before a meeting of the Society that, having visited the south-western part of the State on his former journey, he proposes on this occasion to turn his steps to the district of Coro in the north-west, explore the mountains between Caracas and Barquisimeto, and, lastly, traverse the *llanos* as far, if possible, as the highlands of Guiana.

We have received a preliminary prospectus of a **New Physical Atlas** to be compiled by J. G. Bartholomew, F.R.S.E., F.R.G.S., and H. R. Mill, D.Sc., F.R.S.E. It will be based on Berghaus' work, and will contain a hundred maps. The assistance of Prof. James Geikie, Dr. John Murray, Sir Archibald Geikie, Dr. Buchan, and Prof. Bayley Balfour has already been secured, and other specialists will be invited to co-operate. This important work will be issued in sections, and, when complete, may be had in one volume, or in five smaller ones.

Discontent has been excited among the traders of the **Congo** state by circulars issued by M. Le Marinel, one of which establishes a **State Monopoly** in all the ivory and caoutchouc collected in the basins of the Mobangi, Wellé, and Bomu, while the other forbids the establishment of trading stations above Yakoma, on the plea of insecurity. The *Mouvement Géogr.*, Nos. 15 and 16, doubts the legality of these decrees, which close the whole country to private enterprise. It is to be hoped, in the interests of all concerned, that a satisfactory arrangement will speedily be effected.

Area and Population of the Land of the Globe.—Monsieur Levasseur gives the following estimates in the *Revue de Géographie*, July 1892 :—

		Area in Millions of Square Miles.		Population in Millions.
Europe,		3·9		360
Africa,		11·8		153
Asia,		16·3		824
Oceania,		4·3		38
America	North,	9·2	16·4	88
	South,	7·2		34
Totals,		52·7		1497

The divergences from the estimates in *Die Bevölkerung der Erde*, the *Statesman's Year-Book*, etc., are considerable ; but the absence of accurate data relating to a large part of the world is, in some measure, the cause, and many of them are partly due to a different division of the land.

NEW BOOKS.

History of Sicily : By E. A. Freeman, M.A., Hon. D.C.L., LL.D. Volume III. : The Athenian and Carthaginian Invasions. With Maps. Oxford : At the Clarendon Press, 1892. Pp. xxxv + 750.

Owing to the lamented decease of the author, this great undertaking, monumental in its design and partial execution, must remain a fragment,—a loss which those will most regret who knew Mr. Freeman and his work best.

This volume treats of two great themes,—the Athenian and the second Carthaginian Invasions. It thus covers, in its earlier pages especially, fairly familiar ground. To mention English writers only, Thirlwall, Arnold, and Grote have made the thrilling story of these times part of an English education. But above all these is Thucydides himself, the great master, "who has set down the deeds and thoughts of the men who played their parts in that great struggle as the deeds and thoughts of no other men have been set down before or after" (p. 334). The present volume is, as the two preceding, bulky, conspicuous for breadth of treatment (without, necessarily, a comprehensive view), and for a striving after minute and literal exactness, rich in special and comparative allusions, regardless sometimes of proportion and the demands of the artist.

When so much had to be written that would be new and a solid addition to our knowledge, but which we must now forego, we can only regret, after the event, that Mr. Freeman's plan led him to range so widely about his subject,—to give us, for instance, in this volume of Sicilian history, so much that is Athenian and well known, references at some length to general Hellenic politics, disquisitions on the interpretation of Thucydides' speeches, and on the growth of the use of writing for records and other purposes,—contributions of some value, all of them, but of more than doubtful relevancy. The character-sketch of Hermocrates is typical of Mr. Freeman's excellencies as well as of some of his peculiarities. Hermocrates is compared, contrasted, with Alcibiades ; for him all men, even

Greeks, out of Sicily, are "strangers;" "Sicily for the Sikeliots" is the keynote of his policy; the essentially colonial character of his statemanship is insisted on—the independence of the colony, as in those days, being granted; the nearest approach to his position in the modern world is found in the President of the United States; his policy with regard to the "Western offshoots of Hellas" is the "Monroe doctrine" preached on behalf of the Greeks of Sicily. Then we have a comparison between the Greek in Sicily and the European in America. The march of Dionysius to despotism (Mr. Freeman, in accordance with his usual practice, writes "Dionysios," "Hermokratês," etc.) is traced very clearly, and although it is said that the general view of the tyrant and of his power is reserved for "another chapter," we are introduced by a masterful sketch to a reign which was an "epoch-making time, not only in the history of Sicily, but in the history of the world" (p. 586). The following is excellent in substance:—The fault of Athens in her expedition is that, "having once set her heart on warfare against Syracuse, she went on with warfare against Syracuse when such warfare was clearly shown to be unprofitable as well as unjust. Her fault was that, having once put her trust in Nikias, she went on trusting him when he had himself proved his own unfitness" (p. 577). Just before this we read that democracies, like other forms of government, are capable of wisdom and folly alike in any form. Again, in Syracuse Athens met her match, not merely because Syracuse, as a city, was great and mighty, rich in ships and horses. More: "Democracy was pitted against democracy."

There was much in the story of the Sicilian expedition that admitted of vivid description, and here, as in the *Norman Conquest*, Mr. Freeman has excelled. His knowledge of the scenes of the conflict, patiently acquired, has imparted a freshness and a pointedness to his writing which would otherwise have been wanting. It is interesting to learn (Appendix, p. 595) that Mr. Freeman is sure beyond a doubt that Thucydides went over "every inch of the ground of the Syracusan siege," as he may have done in the tours undertaken by him during banishment (Thucyd. v. 26). The Appendix, extending to some 150 pages, is full of the fruit of research, reminding us again of the *Norman Conquest*. The most valuable of the notes are probably those on the Authorities for the Athenian and the Carthaginian Invasions, on Athenagoras' Theory of Democracy (in which the use of the word is traced), and on the Athenian Occupation of Epipolae. There are four maps, very carefully executed, in illustration of the sieges of Syracuse, Akragas, and Gela, and of the Athenian Retreat.—D. P. H.

The Byzantine Empire. By C. W. C. Oman, M.A., F.S.A., etc. London: T. Fisher Unwin, 1892. Pp. xviii+364. *Price* 5*s*.

Mr. Oman's history of the Byzantine Empire is the latest addition to the excellent series known as "The Story of the Nations." Exclusive of an introductory chapter, which briefly sketches the history of Byzantium from its foundation till its capture by Constantine in 323 A.D., the story covers the period from 328, when Constantinople was founded as the eastern capital of the Empire, to 1453, when that city was taken by the Turks under Mahomet II. The period is thus coincident almost exactly with the Middle Ages in European history. The story of the decline and fall of the Eastern Empire is not one that excites much enthusiasm; but Mr. Oman has contrived to make it extremely interesting. He has shown discriminating judgment in the selection of events according to their importance, and in the delineation of characters according to their prominence. He has not found the ground traversed to be the barren waste which it has appeared to some historians, such as Mr. Lecky, who in this view follows Gibbon. Mr. Oman prefers

to adopt the view of George Finlay and the late Professor Freeman, who recognised, in the midst of much that was mean and unworthy, the important service which the Eastern Empire rendered in the conflict between Christianity and barbarism. There appear on the stage, narrow though it be, men as great and noble as any in history—such as Chrysostom, Justinian, John Zimisces, and Belisarius; and among the Empresses there were pure and heroic women, such as Pulcheria, who took a vow of chastity and ruled the Empire for thirty-six years "as a crowned nun;" and Flaccilla, who frequented the hospitals and tended the beds of the sick; and the brave Theodora, who shamed her husband into resisting the mob when his ministers counselled flight. Mr. Oman's opinion of the social condition of the Empire is that, remembering its origin, there is more cause to wonder at the good points in Byzantine civilisation than at its faults. Mr. Lecky refers to the "perpetual fratricide" of the Byzantine Emperors; but the fact is that from 340 till 1453 there was not a single Emperor murdered by a brother, and in only one instance was an Emperor dethroned by a brother. The history is very much condensed towards the close, the account of the last eighty years of the Empire, including the fall of Constantinople, being compressed into less than twenty pages. The illustrations are excellent.

Volcanoes, Past and Present. By Edward Hull, M.A., F.R.S. London: Walter Scott, 1892. Pp. ix+270. *Price* 3*s.* 6*d.*

In this volume of the "Contemporary Science" Series Professor Hull tells us that his object has been to illustrate the most recent conclusions regarding the phenomena and origin of volcanic action by the selection of examples drawn from the districts where these phenomena have been most carefully observed and recorded under the light of modern geological science. He accordingly gives an account of the chief features of interest in connection with ten areas of active or dormant volcanoes, which have been selected on account of the light their structure throws upon the life-history of volcanoes in general.

The information gathered from these is supplemented by further observations based upon the structural character of extinct volcanoes that have been dissected, as Professor Judd terms it, by denudation. Professor Judd has shown us how important is the information obtainable from this source, and the present author shows that he is fully aware of the fact by devoting not less than sixty pages to this part of his subject.

About sixty pages of the book are devoted to a consideration of the various facts that bear upon the causes of volcanic action. Professor Hull is gratified at finding that his general conclusions upon this point are in accordance with those expounded by the Nestor of modern geology, Professor Prestwich.

A few pages near the end of the book are devoted to a brief account of the principal varieties of volcanic rocks, which is illustrated by two plates showing the appearance of sections of various volcanic rocks when examined in thin slices under a microscope.

Volcanoes Past and Present is well got up, contains some good illustrations, is of a handy size, and may be read with both pleasure and profit by all who are interested in the subject of volcanoes.

A Few Facts about Brazil. By A Twenty Years' Resident in that Country. Birmingham: Cornish Brothers. London: Simpkin, Marshall, Hamilton, Kent, and Co., 1892. Pp. 53. *Price* 1*s.*

Mr. Walter Wright is the author of this little book, and, as might be expected from his long experience in the country he describes, there is much of interest to

be found in his modest pages. His aim is to show the progress made by Brazil, and the potentialities and resources of the country. Rich as these are, a want of enterprise and contentment with present conditions make much progress impossible, and Mr. Wright believes that British capital and British push are required to properly develop the country. He advocates the removal of the seat of trade from the fever-stricken Santos to the more healthy São Paulo, believing that thereby a wonderful change for the better would soon appear in the health returns, and the present prejudice against Brazil as a place settlement, to some extent, removed.

Hungary and its People. By Louis Felbermann. London: Griffith, Farran, and Co., n.d. Pp. 390. *Price* 10*s.* 6*d.*

This work is a compendium of all, or nearly all, sides of Hungarian life—politics, customs, and country. It begins with a sketch of the history of the country from the time when the Magyars crossed the Carpathians. We have then descriptions of Budapest and its environs, and of the Alföld with its Magyar inhabitants. The customs and legends of the Slovaks, Szekelys, Jews, Cziganys or Gypsies, and others of the numerous races that dwell within the bounds of the kingdom of Hungary are touched upon, and industries, trade, and communication, music, literature, and many other subjects find a place either in the body of the work or in notes at the end. The author has produced a very agreeable book for the general reader, for whom it is doubtless intended, but, dealing with such a variety of subjects, he has been unable to give an exhaustive account of any. The addition of a bibliography would have considerably enhanced the value of the work as a book of reference. Most of the illustrations are well executed.

The Lone Star of Liberia. By Frederick Alexander Durham. London: Elliot Stock, 1892. Pp. xxi+331.

The author of this book describes himself as an African, and a student-at-law of Lincoln's Inn. Instead of applying himself to the study of law he assumes the *rôle* of law-giver. His native pride has been roused by the publication of Mr. Laird Clowes' *Black America*, and his intelligence has been insulted by the aspersions cast on his race, not only by Mr. Clowes, but by all previous writers who have failed to recognise the equality, if not superiority, of the "Ethiopian" to his Caucasian brother. He writes with a remarkable power of literary expression, and evinces a superficial familiarity with our history and literature. But his book, if taken seriously, is the most arrant rubbish. In the first place, from cover to cover it is nothing but a violent attack against Laird Clowes, "perfidious Britishers," and Caucasians in general. He adopts the *tu quoque* argument throughout, but rarely with success, his inflated language carrying him off at a tangent at every stage: so that in place of reasoning the patient reader has to be satisfied with a rodomontade. We doubt whether our African critic is not sometimes even libellous. He is, however, very young and enthusiastic, and evidently a promising special pleader. If he were to undergo a systematic course of logic, and to apply himself to mastering a good text-book of ethnography, we might expect from him better literary work in the future. At present he seems strangely ignorant of Africa and her past history. He refuses to attach any meaning to the "Negro" of ethnographers —to whom only Mr. Clowes refers in his book—but insists in speaking of "Ethiopians," as if there were no other terms to designate the well-marked racial characteristics of the African peoples. "Who is there," he asks, "who has not heard of the greatness of ancient Egypt in politics, arts, literature, etc.? And can any one disprove that the ancient Egyptians were of the Ethiopian race? The whole world knows that the Babylonian and Assyrian were mighty empires, whose people were of the Ethiopian race." On the authority of Mrs. Beecher-Stowe, he also claims

"that the Carthaginians were not only Africans, but that they were Ethiopians also."

On the basis of such assertions, he considers "that the expatriated African (alluding to the American Negroes) must not be governed, but must govern." Of course he indignantly denies that all modern native African States are rotten, and incapable of maintaining any semblance of civilised government. "Are not Liberia, Hayti, Morocco, and Abyssinia all independent African States that are flourishing and prosperous?" We leave the reader to answer this question.

We are at one with him in urging the repatriation of the American Negro in Liberia, or in any other part of Africa that will willingly receive an influx of Republican Negroes. But we doubt whether the aristocratic native rulers of Africa would welcome them. Our talented author, however, insists on making Liberia the nucleus of African unity, and looks to the day when "the might and dignity" of the Republic will bring all Africa, or a large part of it, under its enlightened rule. When that day comes there is to be no slave-trade throughout the length and breadth of the continent, and Europe is threatened with swift justice for all her misdeeds. In fact, there is to be no end to the triumph of the Liberian Republic. This new African liberator plainly tells us that the whole world, including that modest portion of it known as the British Empire, is becoming Americanised, and humbly infers that the Americans have yet to reckon with the Liberians.

We hope Mr. Durham feels better after having got rid of so much invective; but we may plainly tell him that he cannot hope to advance the cause he evidently has at heart by indulging in such passionate rhetoric, for the exercise of self-reserve and the display of reason are what readers in this country may reasonably claim of any one who aspires to be a teacher or a leader of men. These qualities of mind are, however, inherited by the average individual as the legacy of centuries of culture, and are as yet conspicuous by their absence in the Negro, notwithstanding many notable individual exceptions to the contrary.

Men, Mines, and Animals in South Africa. By Lord Randolph S. Churchill, M.P. Second Edition. London: Sampson Low, Marston, and Co. (Limited), 1892. Pp. 337. *Price* 21*s.*

Lord Randolph Churchill has here reproduced in book-form the series of letters he wrote to *The Daily Graphic* during his recent visit to South Africa. He informs his readers that he has done this against his own judgment, having humbly accepted the verdict of his critics in the press, that his letters were "devoid of merit and unworthy of perusal." On the other hand, the proprietors of *The Daily Graphic* assured him that his letters were very much liked by the public, and advised him to reprint them, which he has accordingly done in a handsome volume illustrated with the original drawings. That step may be said to have been justified by the fact that already a second edition of his book has been called for. The fact of course shows that a considerable number of persons have been interested either in the subject of the book or in its writer—perhaps in the curious combination of writer and subject. It does not prove that the book is one of permanent value, or that it is of importance as a contribution to geographical knowledge. Probably the author would be the last person to claim for his work this latter distinction, and will be well pleased to be assured that his letters are not less racy and readable in large type and on sumptuous paper than they were in their original dress. Two famous passages which he meant for "chaff" were taken seriously, and provoked adverse comment. He has therefore omitted them. They were his uncomplimentary allusion to the cook of the *Grantully Castle*, and his hazardous

speculation on the origin of the female sex. When attempts at humour turn out so badly, it is wise to suppress them. Among the most interesting portions of the book are those that relate to shooting expeditions. The illustrations come out well on the smooth paper. There is a good map showing the route, and a full index.

Rambles through Japan without a Guide. By ALBERT TRACY. London: Sampson Low, Marston, and Company, 1892. Pp. xiv + 287. *Price 6s.*

Truly of books on Japan there is no end. Here we have the day-by-day jottings of a traveller who with a few weeks' knowledge of the country undertook journeys into the interior without the luxury of a guide. Such boldness is exceptional but not altogether unknown. Mr. Tracy has, however, eclipsed all other like performances by his solitary pilgrimage along the *Nakasendo* (Middle Mountain Road) from Tokyo to Kyoto. As the record of an observant traveller with his eyes open, these pages are interesting reading ; but, from his confessed lack of the ears of understanding, Mr. Tracy has little to offer us that is fresh. We are surprised that Mr. Tracy sees no beauty in the fine lines of the Japanese roof, and we must protest against his use of the word *vermilion* to describe the deep-toned, harmonious red of the Temples. The chief lesson of the book is, we think, its witness to the great national characteristic of the Japanese people—their politeness and kind-heartedness. Some solidity is given to it by the addition of a chapter on the present and future of Japan. In his estimate of the Japanese people as a whole, and of the influences that are at present moulding them, the author displays a candid mind and a calm judgment. He does not lose himself in eulogistic language, and he has a distinct sympathy with the meritorious labours of the Christian missionaries. From Tokyo to Kyoto by the Nakasendo is not so common a route for the tourist as it deserves to be. It passes through some of the finest mountain scenery of Japan ; and yet comparatively few even of the older foreign residents have tried its lofty passes and deep-cleft valleys. Without a series of fine illustrations it would be impossible to do justice to its beauty ; and this perhaps explains why Mr. Tracy's account does not seem to come up to the mark. Still, the book is pleasantly written, and contains not a few amusing episodes. The illustrations are fairly good, although we cannot at all recognise the one called "Tokyo." It may be some out-of-the-way part of that vast city, but it is certainly not a characteristic view of it. The word *kuruma* (=*jinrikisha*) is spelled wrong all through the book—a strange mistake, seeing that generally the orthography is accurate.

La Colonisation de l'Indo-Chine, L'Expérience Anglaise. Par J. CHAILLEY-BERT. Paris : Armand Colin et C^ie^., N.D. Pp. xvi + 398.

British rule in Asia is an undoubted success, and M. Chailley-Bert reasonably considers that much may be learnt regarding the judicious administration of dependencies from a study of the progress of Hong-Kong and Burma. He gives a narrative of the early struggles of Hong-Kong and its varying fortunes until it acquired an established position as a great emporium, and describes the administrative and judicial systems of Upper Burma. Errors of policy are carefully examined, and the treatment of the natives is sometimes severely criticised. He fully appreciates the benefits British rule has conferred on the Asiatic subjects of the Empire, and the aptitude for administration exhibited by military and civil officials, while, on the other hand, he is ready to make allowances in cases of difficulty, as, for instance, when the annexation of Upper Burma made a sudden demand on the civil authorities, which they were naturally unable to meet adequately. While admitting the perfect fairness of M. Chailley-Bert's criticisms, we cannot agree with him on all points. The Indian Civil Service has produced

officials of the highest capabilities, but many who have the best means of judging do not share the author's unreserved admiration for the method of selection which has been in force of late years. It may also be doubted whether, on the whole, the Civil Service is now recruited from a lower class than formerly. As regards the retention by the Government of the freehold of land, there is much to be said in favour of the system in a newly-acquired country. The question has nothing in common with that of nationalisation of land in an old country. The conditions under which the land is leased will, indeed, require careful consideration, that adequate inducements may be held out to settlers, and that the development of the country may not be checked.

M. Chailley-Bert's general conclusions are sound. Colonies and, above all, native dependencies cannot be governed by European laws and functionaries trained up in the routine of home-governments. The character of the natives must be studied, their prejudices humoured, and their customary civil regulations not abolished, but only modified as experience may dictate. As regards commerce, the duty of the government is to leave traders free to find out for themselves the best openings for their activity, and the most advantageous methods of conducting their business, and to second rather than to control their efforts. On all these points and many others M. Chailley-Bert enlarges with considerable ability, and applies his principles to the case of Tongking, which country he had principally in view when writing this work.

Colonial Chronology. With Maps. Compiled and arranged by H. J. Robinson. London: Lawrence and Bullen, 1892. Pp. 304. *Price* 16*s.*

The author of this volume has a very practical and serviceable object in view. It is to present to his readers, within the compass of a single volume, a systematised, comparative view of the growth and development of the British Empire. His work is divided into two parts, both of which are treated chronologically. In the first part we are given, in parallel columns, the chief events in the discovery, history, and political fortunes of countries over which the British flag now flies; and in the second part, the various British Possessions are treated much in the same way, only that each colony, etc., is placed in its alphabetical order.

We have nothing but praise to give, both for the plan and the execution of the first part of the book, most of the entries being well chosen and accurate; though even in this respect a careful perusal suggests many improvements that might be made in a subsequent edition. The framework, however, is good, and might be filled up in far greater detail. As to the second part, we think it is all but useless: the same thing has been done, and done better (except perhaps as regards the chronological sequence of events) in works that deservedly enjoy the public confidence.

The maps in the first part of the books are deserving of commendation.

The Commercial Policy of the British Colonies and the M'Kinley Tariff. By Earl Grey, K.G., G.C.M.G. London: Macmillan and Co., 1892.

The veteran Earl Grey, who was Colonial Secretary in Lord John Russell's Administration of 1846-52, and who is now in his ninetieth year, has written this pamphlet for the purpose of advising the British Colonies, and especially the Dominion of Canada, to adopt the policy of Free Trade. The pamphlet is addressed and dedicated to the people of Canada, because they are most directly and seriously affected by the M'Kinley Tariff, and also because the Canadian Government is under the greatest temptations to defend itself by other expedients—namely, by

retaliatory duties, by reciprocity, by a commercial union, or by a complete political union with the United States. These expedients are carefully examined in succession, and all of them are rejected as unsatisfactory. The pamphlet is written with great vigour and earnestness, and with full knowledge. It is a valuable contribution to the discussion of an important question.

Handbook of Commercial Geography. By George G. Chisholm, M.A., B.Sc. Third Edition, thoroughly revised. London: Longmans, Green, and Co., 1892.

We are glad to notice that a third edition of Mr. Chisholm's excellent *Handbook of Commercial Geography* has been called for. The book has been carefully revised, and the statistics have been brought up to date, or at least to the latest available information. The portion of the book on which the greatest alteration was required is that relating to Africa, which has been to a large extent re-written. The book may now be regarded as a standard authority on its subject; but it is necessary to remember, as Mr. Chisholm points out, that its purpose is educational, and not commercial in the sense of being a storehouse of information.

Mountaineering. By C. T. Dent. With Contributions by W. M. Conway, D. W. Freshfield, C. E. Mathews, C. Pilkington, Sir F. Pollock, H. G. Willink, and an Introduction by Mr. Justice Wills. (The Badminton Library). London: Longmans, Green, and Co., 1892. Pp. xx + 439. *Price* 10*s.* 6*d.*

The names of the contributors are a guarantee of the thoroughness and accuracy of this work. Full information is given as to the outfit required for mountaineering, the use of the rope and ice-axe, the choice of routes up a mountain-side, etc., and the tyro is instructed how to move his limbs in climbing rocks or crossing snow-slopes, how to conduct himself so as not to endanger the lives of his companions, and how to help them when necessity arises. There is also a chapter on "Mountaineering beyond the Alps," wherein the latest feats of Mr. Whymper in the Andes of Ecuador, and Dr. Güssfeldt in Peru and Chili are recorded. Nor is our own island neglected, where, though the mountains are of modest height, some good practice in rock-climbing may be obtained. In "The Recollections of a Mountaineer,' the most famous of Alpine climbers and guides are commemorated. The work should be studied by all who intend to try the invigorating and fascinating pastime of mountaineering, and even those who do not venture beyond the lower glaciers will find its pages interesting. The volume is well got up, and is adorned with numerous and well-executed illustrations, chiefly from the pencil of Mr. H. G. Willink.

Bibliographie Nationale Suisse. Répertoire Méthodique de ce qui a été publié sur la Suisse et ses Habitants. Publiée, avec le Concours des Autorités Fédérales et d'Administrations Fédérales et Cantonales, et en Collaboration avec de Nombreux Savants, par la Commission Centrale pour la Bibliographie Suisse. Berne: K. J. Wyss, 1892. Fascicule II.a. *Géodésie et Cartes de la Suisse, des Régions et Cantons.* Rédigé par le Prof. Dr. J. H. Graf. Pp. xvii. + 193.

This pamphlet is part of an elaborate scheme of bibliography relating to Switzerland, its geography, geology, cartography, natural history (topography, climatology, flora, fauna, etc.), anthropology, and political and social geography in all its various aspects. The scheme is based upon a very comprehensive and well-devised plan, of which the above suggest the principal divisions. The books whose

titles are quoted are arranged, as far as possibly can be done, in chronological order. Those that treat of the entire Confederation are first enumerated; then follow those that deal with the several cantons. A detailed index adds greatly to the usefulness of a most useful compilation and valuable addition to the bibliography of geography. The enterprise and public spirit of the Swiss authorities in carrying out an undertaking of this kind, and of this magnitude, certainly deserve every commendation. The little Republic sets an example in this matter that some of the more powerful States in Europe would do well to imitate.

Tours in Scotland: 1677 and 1681. By Thomas Kirk and Ralph Thoresby. Edited by P. Hume Brown, author of *Early Travellers in Scotland*, etc. Edinburgh: David Douglas, 1892. Pp. ix + 60. *Price 5s.*

This book is a supplement to Mr. Hume Brown's *Early Travellers in Scotland.* One of the spiciest and least flattering chapters in that volume contains "A Modern Account of Scotland," by an English gentleman. The writer concealed his name—not unnaturally, considering the scurrilous and splenetic nature of his remarks on the Scottish people. He was, however, discovered, and Sir Egerton Brydges gave his name as "Thomas Kirke of Crookwige, in Yorkshire." Since the publication of *Early Travellers*, Mr. Cochran-Patrick has called the editor's attention to the fact that a *Journal* of a tour in Scotland by the same writer is printed in the appendix to the *Diary of Ralph Thoresby*, a Yorkshire antiquary, published in 1830. The writer's name, now correctly given, was "Thomas Kirk of Cookridge, Yorkshire." In the present volume Mr. Hume Brown has printed both Kirk's *Journal* and those parts of Thoresby's *Diary* that relate specially to his visit to Scotland, which took place four years after Kirk's. Thoresby and Kirk were neighbours and friends, with literary and antiquarian tastes in common, so that their conjunction is appropriate as well as convenient. Kirk's *Journal* was written two years before his *Modern Account*, and in fact contains in a simple and unadorned narrative the material which the writer afterwards worked up into a finished diatribe. There are in the *Journal* touches of the same smart humour that enters so largely into the *Modern Account*; but the former is of great historical value as a statement of facts and a trustworthy record of observations and experiences, and its tone is by no means so depreciatory as that of the latter. Thoresby's *Diary* is a very plain, matter-of-fact narrative of a tour in Scotland covering only eleven days. In that time the writer visited Dunbar, Haddington, Edinburgh, Falkirk, and Glasgow. He agrees with Kirk and other writers of that day in praising the beauty of Glasgow, describing it as "a very pleasant city, far exceeding Edinburgh itself in the situation and cleanliness"!

Illustrated Pocket Guide to Melrose, Abbotsford, etc. (The Land of Scott). By Ralph Richardson, F.R.S.E. John Bartholomew and Co., The Edinburgh Geographical Institute, 1892. Pp. 38. *Price 6d.*

Mr. Richardson, having consented to act as guide to an excursion to the land of Scott connected with the recent meeting of the British Association for the Advancement of Science, thought it well to publish a small hand-book, useful not only for that occasion, but likely to commend itself to all tourists in one of the most interesting localities in the lowlands of Scotland. Author and publishers are alike to be congratulated on the contents and appearance of the little work, which is written in an easy and interesting manner, handsomely got up in every respect, and enriched by nine clear maps and illustrations. Not only will it be found a useful companion on the journeys themselves, but it should form a valued souvenir of a

visit to the country so closely associated with the life and career of the "Wizard of the North."

The Clyde and the Western Highlands. By Robert Walker. Illustrated by W. G. Gillies and others. London: J. S. Virtue and Co. (Limited), 1892. Pp. 96. *Price* 2*s.* 6*d.*

This ought to be a pleasant and interesting companion to the tourist visiting the district described, and there can be no doubt that it will serve as a valued souvenir of such a visit. The letterpress is well done throughout, the printing is distinct, and the artists have caught the true spirit of the scenes they have chosen to portray, although more care in the process of reproduction would have made the illustrations distincter and clearer. The maps are bad, however—too small for the number of names and natural features they contain—and the hill shading is far from artistic. The volume is tastefully bound.

Our Western Hills: How to Reach them; and the Views from their Summits. By A Glasgow Pedestrian. Glasgow: Morrison Brothers, 1892. Pp. 154. *Price* 1*s.*, in paper covers; 1*s.* 6*d.* in cloth.

The chief fault of this book is its too comprehensive title, leading one to expect information regarding a wider area of the West than is really provided. But, as far as his routes lie, the author has gathered good store of materials, which he lays before the reader in a chatty, pleasant style, not too discursive, and well arranged. We recommend the volume. Those who intend to make it practically useful should provide themselves with the more strongly bound edition.

The Parish of Campsie: A Series of Biographical, Ecclesiastical, Historical, Genealogical, and Industrial Sketches and Incidents. By John Cameron, J.P. With *Calico Printing in Campsie* appended. Kirkintilloch: D. M'Leod, 1892. Pp. xiv. + 248 + 52. *Price* 5*s.*

The Clachan of Campsie. By W. B. Y. D. Edinburgh: Andrew Elliot, n.d. Pp. 32. *Price* 4*d.*

Local histories, if at all well done, are to be welcomed, as they generally afford side-lights on various matters which, in their way, are valuable, and, moreover, of a nature that prevents their being treated of in works of wider scope. The books before us are both fairly good specimens of their class, and, while they will appeal strongly to all natives of and dwellers in the place described, have a certain interest for readers unconnected with the locality. This is especially the case with the smaller work, Mr. Cameron in his more ambitious production being frequently diffuse, and fond of dragging into his pages trifles that can be of no use to any one, besides rambling from one subject to another in a manner which is at times confusing. Both books, however, are valuable in their own place, and afford a considerable amount of solid information, with some very amusing reading.

Illustrated Guide to the Land of Burns; also, Guide to the Town of Ayr. Ayr: *Ayr Advertiser* Office, n.d. Pp. 15. *Price* 2*d.*

To any one visiting Ayr for a few hours the information contained in this little pamphlet may be sufficient, but it will not satisfy those who make a longer stay in that interesting locality. The account of the town is especially scrappy and unsatisfactory. There are numerous illustrations, generally very well produced.

London. Illustrated by Twenty Bird's-eye Views of the Principal Streets. Also a Map showing its chief Suburbs and Environs, and by a Street Map of Central London. Originally compiled by the late HERBERT FRY, and enlarged and brought up to date. London and Calcutta: W. H. Allan and Co., 1892. Pp. xxiv + 276. *Price* 2*s.*

This cheap and handy guide-book supplies exactly the kind and amount of information likely to be required by the average visitor to London. The matter is not too minute in detail, but is sufficiently wide in scope for all ordinary purposes, the information it conveys being set forth in a chatty style, differing from the dry, precise formulæ followed in so many similar volumes. The arrangement is excellent in itself, and there is an exhaustive and easily consulted index, while the bird's-eye views form a feature likely to prove of great practical assistance to the stranger. The maps are coarse in execution, and are the least successful portion of the work, and the large chart, being unmounted, is liable to mishap if unfolded hurriedly, or in a wind. The present is the twelfth yearly edition, a fact which in itself is a strong recommendation.

NEW MAPS.

EUROPE.

SCOTLAND, Geological Map of ——, reduced chiefly from the Ordnance and Geological Surveys, under the direction of Sir Archibald Geikie, D.Sc., LL.D., F.R.S. Scale, 10 miles to an inch. *Price, cloth,* 7*s.* 6*d.*; *rollers,* 10*s.*
Published, with Government authority, by John Bartholomew and Co., Edinburgh.

For many years past geologists have felt much need of a good map of Scotland, which should embody the conclusions arrived at by the numerous workers who have turned their attention to the geology of North Britain during the last fifteen or twenty years. Amongst these workers the officers of the Geological Survey have contributed most largely to the advancement of Scottish geology; and it is to the Survey men, therefore, that the world naturally looks for the authoritative information required. Accordingly, the Director-General of the Survey, Sir Archibald Geikie, having obtained the requisite official sanction for the publication of such of the new material as was based upon the Survey work, decided to have the delineation of the map and sections before us proceeded with in time to have them issued before the Edinburgh meeting of the British Association. As a basis for the map he chose Mr. Bartholomew's excellent "Tourist Map of Scotland," on the scale of 10 miles to an inch, which presents quite sufficient topographical detail for the general purpose in view, without being, in any part, obscured by unnecessary lines.

As regards the execution of the map itself it is impossible to speak too highly. The reduction of the original lines has been carried out in the most careful manner possible, and the engraving, colour-printing, and the general get-up leave nothing to be desired. How it is possible for Mr. Bartholomew to produce such a map at the low price for which it is sold will certainly be more than most persons can understand. It is to be hoped that a very large sale will repay the enterprising publisher, and fully reward him for the public spirit he has shown in this matter.

Geological science advances nowadays with so much rapidity that a lapse of ten or fifteen years may bring about very considerable revolutions in our ideas regarding almost any of the lesser-known formations. A comparison of the map under notice with its predecessor, published in 1876, brings this fact into most instructive prominence. Since that date views have changed to such an extent that the limits of some formations have been much extended, others curtailed, some have changed names, and in other cases entirely new systems have obtained recognition. In every case, and whether the change referred to has originated with the officers of the Survey or with other geologists unconnected with that department, the map has been carefully brought up to date.

Taking the formations in chronological order, we find some important modifications in the area occupied by the Lewisian gneiss and its associated rocks. The very important group of metamorphic rocks, which constitute the largest part of the Scottish Highlands, is now mapped out in considerable detail; its limestones, quartzites, slates, and its associated masses of eruptive origin, being, as far as possible, separated upon the new map. The Torridonians are denoted by a separate colour, as a later formation, but still of pre-Cambrian age. The Durness Series, now known by its fossils to be of Cambrian age, is clearly shown upon the map, while the relations of this important series to the older Torridonians and the gneiss are shown in the clearest manner possible upon Mr. Peach's beautiful section on the margin of the map. The general character of the great post-Cambrian disturbances, with their numerous overfolds and thrust-planes, is also shown, while their description in the accompanying handbook is a perfect marvel of lucidity.

The changes in the mapping of the Ordovician (Lower Silurian) Rocks are not very evident at first sight, but assume more importance on a closer inspection of the map. The area occupied by rocks of Silurian (Upper Silurian) age has been much enlarged, mainly in accordance with the evidence brought forward by Professor Lapworth during the past twenty years.

In delineating the formations comprehended under the one general name of the Old Red Sandstone Series many improvements have been introduced. The volcanic rocks have been more clearly defined from the intrusive masses, and the more persistent courses of tuff have been indicated on the map. The Middle Division of the Old Red Sandstone Series is not, it is true, yet clearly marked off from the Lower; but the limits of the Upper Old Red Sandstone are, in the present map, much better defined than they were previously.

Amongst the rocks of Carboniferous age the chief modification is connected with the areas occupied by rocks of eruptive origin, about which there has always been more or less uncertainty.

The New Red Rocks of the Solway Basin are now grouped into Upper (Trias) and Lower (Permian), instead of being left entirely under the Lower division, as before.

In the areas occupied by rocks of Jurassic and of Cretaceous age many improvements may be noticed on the map.

Lastly, in the Tertiary volcanic rocks of the Western Isles the results of Sir Archibald Geikie's late researches are embodied. A noticeable feature in this connection is the addition of the more conspicuous of the basic dykes of Tertiary age, which traverse the south-western parts of Scotland.

Around the margin of the map are placed six lines of section, in illustration of as many different types of structure. These, with the twenty-three pages of Explanatory Notes which accompany the map, ought to make every part of it perfectly intelligible even to those who know but little of geology.

WEISSENSEES, Tiefenkarte des —— in Kärnten. Nach eigenen Messungen von Dr. Karl Grissinger. Nebenkarten : 10 Querprofile und 1 Längenprofil des Weissensees.

Die Fortpflanzungen der Sonnenwärme im Weissensee nach Untersuchungen im September 1891. Von Dr. Karl Grissinger.

Petermann's Geographische Mitteilungen, Jahrgang 1892, *Tafel* 12 *und* 13. *Gotha: Justus Perthes.*

PROVINCIA DI ROMA, Carta Topografica della —— e regioni limitrofe fino ad Avezzano, Spoleto e Gaeta, con cartina speciale dei Colli Albani secondo i recenti rilievi del R. Stato Maggiore con speciali indicazioni dell' altimetria, delle reti stradali, e delle circoscrizioni amministrative ed elettorali, disegnata da G. E. Fritzsche. Scala 1 : 250,000. *Roma: Istituto Cartografico Italiano.*

This entirely new map of the Province of Rome is drawn in the same style, and on double the scale, as the map of Sicily, published some time ago by M. Fritzsche. The elevation of the land above sea-level is indicated by contour-lines drawn at 50, 150, 350, and 500 mètres, and is rendered more conspicuous by shades of green and brown. The boundaries of the different departments, electorates, and communities are shown by red lines. All means of communication, as railways open and under construction, tramways, roads and footpaths, are clearly laid down. The hills are shaded and printed in brown. An inset map of the famous Colli Albani, on the enlarged scale 1 : 75,000, has been added. The map is nicely drawn, and will undoubtedly prove very useful to tourists.

PROVINCIA DI CATANIA, Carta Stradale della ——. Scala 1 : 200,000. Eseguita sotto la direzione dell' Ufficio Tecnico Provinciale.

Roma: Istituto Cartografico Italiano.

This map gives a correct idea of all means of communication in the province at the present time. The railways, the provincial roads, and those belonging to the communes, are indicated according as they opened, or under construction. The communes are shown by different tints, while the boundary-line dividing the province into two departments is marked as a dotted line. An index giving the length of 22 roads in kilomètres has been added. The map is very clear, but has no network of parallels and meridians ; and a scale in kilomètres might have been engraved to measure distances.

AFRICA.

AFRIKA, Spezial-Karte von ——, im Massstabe 1 : 4,000,000 (10 Blatt), entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domar, und Dr. Richard Lüddecke. III. und IV. Lieferung. *Gotha: Justus Perthes.*

Sect. "West Sahara," by B. Domar, and Sect. "Congo," by H. Habenicht, form the third issue of this excellent map of Africa. The corrections on both sheets have been very numerous. The fourth part contains the sections "Kapland" and "Delagoa Bai," by Dr. R. Lüddecke. On these sheets the whole of the South-African Republic and the Orange Free State have been entirely redrawn from Jeppe's well-known map. The authors have endeavoured to incorporate all data received up to the time of going to press. An explanatory letterpress accompanies each section, and shows the great pains which have been taken to bring this standard work of African cartography up to date.

SIERRA LEONE and the Interior to the Upper Waters of the Niger River, illustrating the paper of G. H. Garrett, Esq. Reduced from the original drawing of the author. *Proceedings of the Royal Geographical Society, July* 1892.

RIVER TANA AND MOUNT KENIA, A map illustrating an expedition up the ——, commanded by Captain F. G. Dundas, R.N., and mainly based upon Surveys by Mr. C. W. Hobley and the Explorations of other Officials of the Imperial British East Africa Company. By E. G. Ravenstein, F.R.G.S. Scale 1 : 1,000,000. *Proceedings of the Royal Geographical Society, August* 1892.

EQUATORIAL AFRICA, Map of ——, showing stations of the Missionary Societies. Scale 1 : 1,650,000, or 26·5 statute miles to 1 inch.
London and Liverpool: G. Philip and Son.

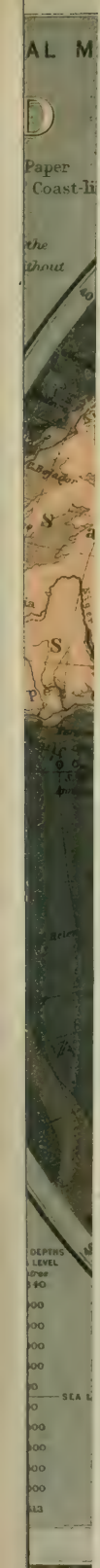
The great efforts which have recently been made by the different missionary societies in Equatorial Africa are well shown by the numerous stations marked on this map. Sixteen societies are at work in this part of Africa, and the initials of their designations are given in brackets opposite their stations. The map is drawn in a bold diagrammatic style ; the edition before us is printed on cloth, and will be very useful indeed to lecturers. Contour-lines are given at 1500 and 3000 feet above sea-level, and are distinguished by two shades of brown. The new mission station, Kibwezi, in British East Africa, founded last year by Dr. Stewart, has been omitted. The map is admirably executed and will suit the purpose for which it has been designed.

SÜDAFRIKANISCHEN REPUBLIK UND DEN PORTUGIESISCHEN BESITZUNGEN, Neue Grenze zwischen der ——. Nach den neuesten Quellen zusammengestellt und gezeichnet von Friedrich Jeppe. Massstab 1 : 1,000,000.
Petermann's Geographische Mitteilungen, Jahrgang 1892, *Tafel* 11.
Gotha: Justus Perthes.

ATLAS.

THE UNIVERSAL ATLAS, complete in 28 parts, including Index. Published by Cassell and Co., Limited, London, for the Atlas Publishing Company, Limited. Parts XI., XII., XIII., and XIV.

Part XI. contains an ethnographic map of the Balkan Peninsula, Constantinople and the Sea of Marmora, Northern Italy, and a good general map of the United States. Part XII. includes the northern continuation of the map of England and Wales, which is much clearer than the southern portion previously published. A map of Afghanistan with Baluchistan, and Siam with the Malay Archipelago, form the second sheet. Baluchistan, which is a British Protectorate, ought to have received the same colouring as India—perhaps in a lighter shade. Part XIII. consists of a map of the British Empire throughout the world on Mercator's projection, showing the commercial routes and ocean-currents, the Caucasus, and Greece. On the British Empire map, also, Baluchistan is not coloured as British. Part XIV. contains a map of Ireland, on a smaller scale than England and Wales : an ethnographic map of Europe, with four insets, showing the districts of the Basque and Breton languages, the boundaries of languages in South Tyrol, and of the Flemish language in Belgium. A double-page map of the Austrian Alps concludes this part. The maps are very well drawn, and, with the exception of England and Wales, are the same as in the German edition.


AL M
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thout
DEPTHS
LEVEL
SEA L

BATHY-HYPSOMETRICAL MAP OF THE WORLD

Illustrating Prof Ja^s Geikie's Paper on The Geographical Development of Coast lines

NOTE

The Map is coloured to show the surface relief of the Globe without water in the Ocean Basins

J.G Bartholomew

WESTERN HEMISPHERE

EASTERN HEMISPHERE

EXPLANATION OF COLOURING

The Colouring is graded from the Darkest Tint at the Lowest level to the Brightest Tint at the Highest

SCALE OF HEIGHT FROM WATER			SCALE OF HEIGHT & DEPTH ABOVE & BELOW SEA LEVEL	
Eng Feet	Metres	Greatest Depths	Eng Feet	Metres
18,933 - 17,332			29,002 - 28,400	
17,331 - 16,732			28,399 - 26,367	8600
16,731 - 16,132			26,366 - 24,584	8000
16,131 - 15,532			24,583 - 23,129	7400
15,531 - 14,932			23,128 - 21,675	6800
14,931 - 14,332			21,674 - 20,222	6200
14,331 - 13,732			20,221 - 18,769	5600
13,731 - 13,132			18,768 - 17,316	5000
13,131 - 12,532			17,315 - 15,863	4400
12,531 - 11,932			15,862 - 14,410	3800
11,931 - 11,332			14,409 - 12,957	3200
11,331 - 10,732			12,956 - 11,504	2600
10,731 - 10,132			11,503 - 10,051	2000
10,131 - 9,532			10,050 - 8,598	1400
9,531 - 8,932			8,597 - 7,145	800
8,931 - 8,332			7,144 - 5,692	200
8,331 - 7,732			5,691 - 4,239	200
7,731 - 7,132			4,238 - 2,786	600
7,131 - 6,532			2,785 - 1,333	1000
6,531 - 5,932			1,332 - 120	1400
5,931 - 5,332			119 - 0	1800
5,331 - 4,732			0 - 1,212	2200
4,731 - 4,132			1,213 - 2,664	2600
4,131 - 3,532			2,665 - 4,116	3000
3,531 - 2,932			4,117 - 5,568	3400
2,931 - 2,332			5,569 - 7,020	3800
2,331 - 1,732			7,021 - 8,472	4200
1,731 - 1,132			8,473 - 9,924	4600
1,131 - 532			9,925 - 11,376	5000
531 - 0		Greatest Known Depth	11,377 - 12,828	5400
			12,829 - 14,280	5800
			14,281 - 15,732	6200
			15,733 - 17,184	6600
			17,185 - 18,636	7000
			18,637 - 20,088	7400
			20,089 - 21,540	7800
			21,541 - 22,992	8200
			22,993 - 24,444	8600
			24,445 - 25,896	9000
			25,897 - 27,348	9400
			27,349 - 28,800	9800

Journal of Geography, May 1st, 1891.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

A JOURNEY THROUGH LESSER TIBET.

By Mrs. Bishop, F.R.S.G.S.

(*Read at a Meeting of the London Members of the Royal Scottish Geographical Society, May* 1892.)

To-night, at the request of the Council of the Royal Scottish Geographical Society, I have the honour of giving a slight sketch of a recent journey through the country of the Bhots or Tibetan Buddhists, which is not inappropriately termed Lesser Tibet—that outlying governorship of Kashmir, which includes Ladak proper, Nubra, and Rupchu, one of the loftiest inhabited regions on earth, with boundaries indicated to the north by the Karakorum ranges, to the south by the British Tibetan districts of Spiti and Lahul, to the east by Chinese Tibet, and to the west by Baltistan or Little Tibet.

The country has been so carefully mapped and surveyed as to leave no room for the explorer. Its peculiarities are well understood, and the utmost I can aim at is to give an aspect of freshness to what are to some extent beaten tracks.

Reaching Kashmir in the early spring of 1889, I travelled in the Jhilum Valley, and the mountain gorges which descend upon it, for two months, till the greenery of the velvet sward turned tawny, and hot winds came, and a brown dust haze hung heavily, and there was no *marg* or ravine, however remote, in which escape was possible from the clatter of English voices and the obsequiousness of Hindu servants, and even the cool shades of lofty Sonnamarg, high up the Sind Valley, and rough of access, had capitulated to lawn tennis and badminton.

I left Sonnamarg on a late afternoon in June for a four months' journey in Ladak, my "outfit" consisting of two servants, a Pathan soldier of the Maharajah of Kashmir's guard, three baggage ponies, an

Arab horse, a small Cabul tent, and a shelter tent five feet square, and I took twenty-five days for the nineteen marches from the Kashmiri to the Ladak capital. Baltal, the last camping ground in Kashmir, is a deodar-belted, solitary, flowery Alpine meadow, noisy with the dash of icy torrents tumbling from the snow fields and glaciers upborne by the huge wall of rock, which is the first of the three great steps to the Tibetan heights from Kashmir—the Zoji La, 11,300 feet in altitude; the Namika La, 13,000; and the Fotu La, 13,500.

The Zoji La is not alone the dividing line between Kashmir and its dark-skinned people and the Tibetan altitudes with their yellow-skinned race, but between all the softer and fairer features of this earth and the scored and arid mountain sides and verdureless plains of Central Asia. For 2000 feet the path ascends in steep and broken zigzags, difficult for laden animals, among trees, ferns, and flowers. It was sunrise, and in the dewy, rose-flushed atmosphere, high above the pass a mass of grey and red mountains, snow-slashed and snow-capped, rose in peaks, walls, pinnacles, and jagged ridges, above which towered yet loftier summits, bearing into the heavenly blue fields of unsullied snow alone. Below, as a last dream of beauty, stretched the Baltal Valley, green as an English lawn, starred with white lilies, and dotted with clumps of trees, which were festooned with red and yellow roses, white jasmine, and clematis. Above the hardier deciduous trees appeared the *Pinus excelsa*, the silver fir and the spruce, higher yet the stately grace of the deodar clothed the hill sides, and above the forests, rose-tinted in the sunrise, rose the snowy mountains of Tilail. I never saw natural grass or forests again till I descended months later into the paradise of Kulu.

On the Tibetan side there is a very gradual descent among stunted birches, along a wide valley, blocked by snow for nearly half the year, which, so late as the 21st of June, was filled for many miles with difficult and much crevassed snow-fields and decaying avalanches, while on the same day I crossed the Dras River four times on snow bridges. The Zoji La is the lowest depression in the great Himalayan range for 300 miles, and by it all the traffic of Kashmir, the West Panjāb, and Afghanistan passes into Central Asia, in spite of very bad bits of road, leading to heavy losses of goods and animals on the Sind and Suru Rivers. Passing through broad, stony, uninhabited valleys, along the Dras River, and through the open country of Dras, with its many hamlets, peopled by hardy, friendly Dards and Baltis, and among mountains from 18,000 to 21,000 feet in height, the road takes to the valley of the thundering Suru as far as Kargil, the chief cluster of villages in the little Moslem State of Purik, part of Baltistan, or Little Tibet, inhabited by Ladak Buddhists who have embraced Islam.

By roads must be understood bridle tracks worn by traffic alone across the gravelly valleys, but constructed with great toil and expense along the sides of the gorges, sometimes being blasted out of the edges of precipices from 1000 to 3000 feet in depth, but oftener scaffolded—that is, poles are lodged among the crevices of the cliff, and are loosely covered with slabs or planks and brushwood. The track is always amply wide for a loaded beast, but when two caravans meet the animals of one must be driven up

the mountain-side, where foothold is difficult. On this very Suru road my Pathan soldier caused the loss of one animal, and my servant's horse rolled over the precipice, and was drowned in the torrent. The bridges are made by laying two or more logs across the stream, and filling up the spaces between with twigs and soil, but so scantily that the wild rush of the water is seen below, and horses break through, ofttimes breaking their legs or losing their loads.

Up to Kargil the scenery, although growing more Tibetan with every march, had shown some traces of verdure. Bright crimson roses growing alongside the streams represented woody vegetation, and the valleys and lower hill slopes were one mass of irises, lychnis, artemisia, gentian, asters, and anemones, with a predominance of umbelliferæ and compositæ, and as the millions of corollas, in the glory of their passionate but brief existence, drank in the sunshine and rippled in waves of colour in the strong afternoon wind, the effect was kaleidoscopic. But after leaving Kargil the marches were over blazing gravel or surfaces of denuded rock, the singular *Caprifolia horrida*, with its dark green mass of waxy ovate leaves on trailing stems, and its fair, white, anemone-like blossom, and the graceful *Clematis orientalis* the only vegetation. Yet at certain halting places where irrigation is possible there are poplar and willow plantations, and in the lucerne which flourishes in their shelter there are pleasant camping grounds.

It would not be fair to expect much greenery, for in Ladak the valley bottoms are 10,000 feet and upwards in altitude, and the range left behind at the Zoji La intercepts the moisture, besides which the rarefaction of the air at the general level of the province prevents it from holding any in suspension. The rainfall is confined to a drizzle of an hour about four times a year, and the snow-fall is scanty and disappears rapidly by evaporation. The water for irrigation is derived chiefly from the glaciers, which occupy every hollow in some of the ridges, and occasionally, as in the Dras country, descend as low as 11,000 feet. In addition to this intense atmospheric dryness, the whole region is swept by a regular day wind from the south and south-west, rising punctually at nine A.M. and blowing with great violence in the afternoon, its pressure at half-past two usually exceeding six pounds to the square foot. As the highly rarefied air offers scarcely an obstacle to the direct transmission of the sun's rays, they are far more powerful as ascertained by scientific observers than in the hottest parts of what are truly called "the burning plains of India." At Digar in Nubra, at an elevation of 14,000 feet, I noted a solar heat of 140°, and in Rupchu, near the Lachalang Pass, at a height of over 15,000 feet, a solar temperature of 152°, or only 32° below the boiling point of water in the same region. In the same month, August, the mercury fell below the freezing point nearly every night with a north and north-easterly wind, which is as regular as the day wind. I soon found that these peculiarities of climate translate into ordinary life thus:—The air passages become irritated, the skin cracks, the hair when released stands out from the head, leather shrivels and splits, horn combs break to pieces, food dries up, the rapid evaporation renders painting in water-colours nearly an impossibility, and tea

made with water boiling at a temperature of from 187° to 195° is a tasteless and unstimulating beverage.

Passing from Kargil along faces of precipices, and over waterless plateaux of red gravel, and down a ravine walled in by mountains of scorched rock flaming in vermilion, crimson, and orange, with shadows in purple madder, opening on a chaos of rocks and sand, the twelfth march brought us to Shergol, the first village of Tibetan Buddhists, with a *gonpo* or monastery partly excavated in the cliff, and various extraordinary religious buildings with rudely frescoed figures in red and blue.

At this point the great interest of the journey began, *i.e.* the human interest. Not greater is the contrast between the grassy slopes and deodar-clothed mountains of Kashmir and the flaming aridity of Ladak than between the tall, dark, handsome, graceful natives of the one, with their statuesque and shrinking women, and the ugly, short, squat, yellow-skinned, flat-nosed, oblique-eyed, uncouth-looking people of the other. The Kashmiris are false, suspicious, and cringing; the Tibetans truthful, trustful, and independent, one of the pleasantest of peoples. The small and dreary mosques of Islam, the thresholds of which no Christian may cross, were exchanged for universal and imposing signs of religion. Beyond Shergol, and throughout Ladak and Nubra, are colossal figures of Shakya Thubba (otherwise Gautama or Sakyamuni) and Chamba cut on the faces of rocks; *chod-tens* or offering receptacles dedicated to one of the holy Buddhas, and *dung-tens* or bone holders. Both the latter are of the same construction, and consist of a peculiar obelisk terminating in a holy emblem mounted on a decorative pedestal, the whole from 20 to 100 feet in height. These are scattered over elevated ground, or in long and imposing avenues line the approaches to villages. There are *manis* also, which are dykes of stone from 6 to 16 feet in width, and from 20 feet to half a mile in length, frequently terminating in *chod-tens*, and invariably covered over with flattish stones inscribed by the lamas with the mysterious exclamation, or shall I call it prayer, "*Aum mani padme hun.*" The erection of a *mani* is a pious deed, and the inscribed slabs which are purchased at the *gonpos* are votive offerings for the attainment of special objects. There are also figures of Shakya Thubba in wood or stone, always seated, the right hand on the right knee, the left holding the alms dish; some of them gigantic, as at Shé, where there is a copper gilt Buddha, 37 feet in height, seated on a lotus throne 81 feet in circumference. Besides these there are frequent rows of prayer mills, occasionally as many as 150 in a row, each containing a long roll of paper inscribed from 10 to 1000 times with the sacred words aforesaid, and revolving easily by being brushed by the hand of a passer by. Larger cylinders are turned by pulling ropes, and others, larger still, by water-power. The most imposing is in Nubra, and is kept in a gilded temple with priests in constant attendance. This red wooden cylinder, which is said to contain 20,000 repetitions of this mantra, is 10 feet high and 4 in diameter, is worked by an unfailing stream, and rings a bell with every revolution, the fee for each being from 1d. to one rupee.

On entering the region containing the great monasteries of Lamayuru

and Mulbek I constantly met red *lamas* in companies twirling their prayer cylinders, abbots, and *skushoks*, the latter believed to be incarnations of Buddha, on horseback, with many retainers—or gay groups of priestly students intoning in a high pitched monotone, *Aum mani padme hum*. The glory and pride of Ladak and Nubra are the *gonpos*, and some of the finest are seen on this route to Leh. They combine every element of the picturesque. They are vast, irregular piles of fantastic buildings, almost invariably crowning lofty isolated rocks or mountain spurs, reached by steep rock staircases, *chod-tens* below and battlemented towers with curtain walls above, temples, domes, bridges over chasms, spires, and scaffolded projections gleaming with gold, looking like the outgrowth and blossom of the rock itself. The outer walls are usually whitewashed, and red and yellow buildings, broad bands of red and blue, and tridents, prayer-mills, and yaks tails and innumerable flags on poles fluttering in the breeze give movement and vivacity, while the jangle of cymbals, the ringing of bells, the incessant beating of big drums and gongs, and the braying at intervals of six-foot silver horns attest the devotion of the community within. The *gonpos* contain from two *lamas* up to three hundred, as at Hemis. They are fortified, and might be impregnable but that not one has any water supply.

The ugliness of the Tibetans produced a deeper impression daily. They have high cheek-bones, broad flat noses without visible bridges, small oblique eyes with heavy lids, thick, big, projecting ears deformed by great hoops, wide mouths, full lips, black straight hair approaching horse-hair in coarseness, and short, square, ungainly figures. The men have smooth faces.

The male costume is a girdled woollen *choga* with under garments, woollen leggings, and a cap with a turned-up point over each ear. The women wear short jackets, full-plaited skirts, tight trousers a yard too long, the superfluous length forming folds above the ankle, and a sheep-skin with the fur outside hangs over the back. Great ears of brocade, lined and edged with fur, are attached to the hair, which is dressed once a month, and is worn in many plaits fastened together at the back by a long tassel. A broad strip of cloth sewed over with large turquoises, silver ornaments, and carbuncles, with a point on the brow and hanging to the waist behind is worn by every woman. Felt or straw shoes and many ornaments are worn by both sexes, but neither costume nor ornament modifies the ugliness. They wash once a year, and except at festivals never change their clothes till they begin to drop off; they are vigorous and attain extreme old age, their voices are harsh and loud, and their laughter is noisy and hearty.

On the remaining marches, which are exclusively among Tibetans, I found the people very cordial and friendly. In every village I was invited to the headman's house and introduced to the chief inhabitants and objects of interest: every traveller, lay or clerical, passed by with the cheerful salutation *Tzu*, asked me where I came from and whither I was going, wished me a good journey, admired my horse, and when he scaled rock ladders and scrambled gamely through difficult torrents they cheered him heartily, like Englishmen, their whole demeanour contrasting with the chilling aloofness of Moslems.

Past fascinating monastic buildings, through crystal torrents rushing over red rock, through stupendous ravines, on precipice edges by scaffolded paths, camping at night at villages on oases of cultivated alluvium, and down the Wanla water by the deepest and narrowest cleft ever used for traffic, I reached the Indus, crossed it by a wooden bridge where its fierce flood is narrowed by rocks to 65 feet, and at the fort of Khallach entered Ladak proper. For the remaining four marches the path skirts the tremendous granite range, which divides the Indus from its great tributary, the Shayok, crosses stony plateaux formed of granite detritus, on which the hamlets are few and the vegetation is limited to the *caprifolia horrida*, and ascends the broad Indus valley for 1200 feet from Khallach. After a journey of twenty-five days I camped at Spitak, among the *chod-tens* and *manis* which cluster round the base of a lofty isolated and fortified rock crowned with one of the most striking monasteries in Ladak, only five miles from Leh.

This *gonpo* possesses a *skushok*, an incarnate Buddha. I met him in a village house, surrounded with the emblems of deity, and worshipped on bended knees; but he was human enough to say that he remembered having seen me at Srinagar, where he and many of his monks were unwillingly obeying a summons from the Maharajah to perform a rare religious dance before Lord Roberts,—which I had witnessed by torchlight in the Residency grounds. The ancient brocades and lacquer masks worn on the occasion were superb. Amidst lanterns and torches, waving censers, braying horns, and beating drums, eight acts of a drama of the future world were performed, in which beings with the heads and tusks of wild boars, dragons, monks, hobgoblins, blue and red devils, and even the king of terrors himself swayed and circled in rhythmical confusion, redoubling their pace as the wild music grew quicker, madder, more delirious, till some of the Europeans withdrew in horror, some became faint, and the diabolical performance ended in the triumph of Death, the *skushok* remaining impassive throughout, acolytes standing beside him bearing golden censers and lamps. There are many religious dances in Ladak, but the Spitak dance is special, and is supposed by many to have been adopted by the Buddhists from a yet older religion. It is intended to show the wicked the terrors which await them, and to prepare the good for the class of risks which they may encounter on leaving the flesh.

On ascending for 1000 feet the blazing slope of gravel which lies between the Indus and the city, and on which even in the early morning the atmosphere was quivering under the rays of a sun scintillating and white like a magnesium light, Leh is hardly to be disentangled from the bare, ribbed, jagged, scored, vermilion and rose-red mountains which almost surround it. Long lines of *chod-tens* and *manis* mark the approach. Then come barley-fields, and poplar and willow plantations, bright streams are crossed, and a small gateway, within which is a colony of very poor and leprous Baltis, gives access to the city. I was received by the Wazir's jemadar, and spahis in apricot turbans, violet *chogas*, and green leggings, who cleared the way with spears, and escorted me to the shady bungalow of Her Majesty's Joint-Commissioner, who resides at Leh for four months of each year, the only permanent European residents

being two Moravian missionaries. There my Pathan soldier was recognised as one of a band of ruffians who had recently murdered their commanding officer at the fort on the Indus under atrocious circumstances, and was arrested and marched back to Srinagar.

Leh, as one of the centres of Central Asian commerce, is not a place to be overlooked. There all traders from India, Kashmir, and Afghanistan must halt for animals and supplies, whether they take the Karakorum route to Yarkand or the Changchemno route to Yarkand and Khotan, and there also the Lhasa traders do an extensive business in brick tea, and Lhasa wares, chiefly ecclesiastical. The centre of Leh is a wide bazaar, where much polo is played in the afternoons, above which the irregular, flat-roofed, many-balconied houses of the town cluster round the palace of the former kings or *Gyalpos* of Ladak, which occupies a commanding site near the middle of the town, and, with a colossal *chod-ten* beside it, can be seen for many miles. This palace is from seven to ten stories in height, and 250 feet in length, the inward slope of its walls giving it a singular aspect of massiveness, while long balconies, galleries, carved projections of brown wood, and prominent windows give picturesqueness to a pile which is an apparent outgrowth of the spur of the rocks on which it stands, whose ragged crest is crowned by the fantastic buildings of an ancient monastery North of Leh, at a few miles distant, is the huge Kailas range, with its glaciers and snow-fields, its passes alone attaining an altitude of nearly 18,000 feet. To the south, across the gravelly descent and the Indus valley, rise red ranges, dominated by snow peaks more than 21,000 feet in height. The architectural features of Leh, except the palace, are mean. A new mosque glaring in colour, a treasury and court of justice, the Wazir's bungalow, a British hospital and dispensary, under the charge of the Moravian medical missionary, two humble Moravian houses, a Moslem cemetery, and Buddhist cremation grounds are all that is noteworthy. The narrow alleys house a mixed population, in which the Moslem element is always increasing, partly owing to the renewal of that proselytising energy which is making itself felt throughout Asia, and partly to the marriages of Moslem traders with Ladaki women. The children of such unions are termed *Argauns*, who, while inferior in moral qualities, show a much greater aptitude for trade than the pure Ladakis. On my arrival few of the shops were open, and there was no business, but a few weeks later the little desert capital doubled its population of a little over 3000 souls, and during August the din and stir of trade and amusement ceased not by day or night, and the shifting scenes were as gay in colouring and as full of variety as could be desired. Great caravans arrived daily from Kashmir, Cabul, the Panjāb, and Lhasa. The Lhasa traders opened shops in which brick tea and instruments of worship were the specialties; merchants from Bokhara, Cabul, and Yarkand, stately in costume and gait, thronged the bazaar; bales of costly goods lay in the roadway; mules, asses, horses, and yaks kicked, bit, squealed, and bellowed; the harsh dissonance of bargaining tongues rose high; there were mendicant monks, Indian fakirs, possible *Mahatmas*, Moslem dervishes, itinerant Buddhist ballad-singers, Mecca pilgrims, women with

creels on their backs, bringing in lucerne, Ladakis, Baltis, and Lahulis tending the beasts, and the Wazir's jemadar and his gay spahis always hovering on the fringe of the throng. In the midst of this picturesque confusion the short, square, Lhasa traders, who face the blazing sun in heavy winter clothing, exchange their expensive tea for Nubra and Baltistan dried apricots, Kashmir saffron, and rich stuffs from India, and raise to fever heat the traveller's desire to explore the land which lies behind their frowning frontier. There are not lacking traders who regard with dismay the eastward march of the Russian Central Asian Railway, and prophesy a time in the near future when the through trade of Ladak will be reduced to nothing, and Central Asia will be supplied with Russian goods by Russian enterprise only. Russian cottons, hardware, and knick-knacks are finding a place in the Leh markets, and Russian roubles and copecks are occasionally offered as change.

North of Leh, across the Kailas range, lies the mountain district of Nubra, similar in general character to Ladak, but the valleys are less elevated, the mountains loftier, the *gonpos* richer and more numerous, and the people simpler, more religious, and more purely Tibetan. Upper and Lower Nubra consist of the valleys of the Shayok and Nubra rivers, deep, fierce, and variable streams, which have buried the lower levels under great stretches of shingle, patched with thickets of hippophæ and tamarisk, affording cover for innumerable wolves. To these rivers lateral torrents descend, and on the alluvial fans thus formed are the villages, with their pleasant surroundings of barley, lucerne, poplar, willow, and fruit trees, each hamlet with a *gonpo* crowning a spur above it, while on certain steep, isolated rocks there are villages, *gonpos*, and fortifications with their intricate pathways, crowded together, a common roof covering the whole. The mountains descend on the valley in grey or vermilion masses of naked rock 7000 and 8000 feet in height, above which rise snow-capped peaks, sending out spurs and buttresses of fantastic forms, while the colossal walls of rock are cleft by peaks as colossal. The central ridge between the Nubra and Upper Shayok valleys, which breaks off abruptly at the great bend of the Shayok, is 20,000 feet in altitude, and on it are superimposed five peaks of rock ascertained by survey to be from 24,600 to 25,000 feet. At some points the eye takes in a nearly vertical height of 15,000 feet from the level of the Shayok river! The Shayok valley is about five miles wide at its widest part, the Nubra valley above the junction of the two rivers less than four. The most frequented route to Yarkand lies this way, the winter road lying chiefly along river-beds then nearly dry, while the summer traffic has to find its way along rough tracks at great heights, where mud and snow avalanches are common, to climb dangerous rock ladders, and to cross glaciers and the risky fords of the Shayok. The Nubra people supply the traders with transit animals, fodder, and grain. Nubra even for sport has few attractions for Europeans, but were there time to enter upon details, I think I could justify my opinion that it is interesting and fascinating.

I left Leh for a three weeks' journey in this region under favourable circumstances, having as my interpreter Mr. Redslob of the

Moravian Mission, a learned Tibetan scholar and very popular with the people, and Gergan, a highly educated Lhasa lama, and a landholder in Nubra. The Kailas range, dividing the drainage of the Indus and Shayok, and regarded as the most formidable of the obstacles between Leh and Yarkand, is crossed in summer by the Khardong Glacier Pass, but it was not open, and we adopted the Digar Pass, camping the first night in severe frost and a biting wind at 16,000 feet. On that and the following day our men and animals experienced the effect of the rarefied air, in what the Tibetans call *ladug* or "pass poison," which they believe to be the odour of some wild plants. The horses, gasping for breath though unloaded, could walk only a few feet at a time, with blood dripping from their nostrils. Several of the men suffered from vertigo, vomiting, violent headache, bleeding from the ears, nose, and mouth, and prostration of strength so severe in some cases that the victims had to be carried in blankets slung on poles. From that point we and our luggage were conveyed on yaks. This magnificent animal, the pride of the Tibetan Highlands, with his huge apparent size, his thick curved horns, his fierce eyes glaring from under a mass of shaggy curls, his long hair hanging to his fetlocks, and his huge bushy tail, an emblem of dignity in temples and oriental courts, deigns to be led by a rope through his nostrils, and I rode him on my own saddle. Some of my yaks shied, plunged, and kicked, executed fantastic movements on the edges of precipices, bellowed defiance, knocked down their leaders, and rushed madly down mountain sides, leaping from boulder to boulder till they landed me among their fellows, compelling me eventually to trust to my horse, whose exploits on rock ladders won the sympathetic admiration of the mountaineers. The dreary stretches of the ascent of the Digar, though at first white with *edelweiss*, of which the Tibetans make their tinder, yielded to steep zigzags of broken stone and frozen snow. We attained the summit, 17,930 feet, in a snowstorm, and there the guides praised their gods and tucked rag streamers into a cairn. Over wastes of ice, across snow-fields margined by mauve and rose-red splashes of three species of primula, and down desert valleys and irrigated hill-sides we descended 3500 feet to the village of Digar, where I noted a solar temperature of 142°!

The first view of Nubra is not beautiful. Yellow, absolutely barren mountains, cleft by yellow gorges and apparently formed of yellow gravel, looking as if they had never been finished, or else had been finished so long that they had returned to chaos, hem in a valley of white sand and shingle, threaded by a turbid stream. The disintegration of these mountains is remarkable. They are huge slopes and mounds of gravel, tremendous rifts in their sides alone showing their substructure of rock. The rainfall hardly exceeds two inches, the snow-fall is moderate, and disappears by evaporation and by being driven by the wind into the chasms. Is it possible that the disintegration is in great measure caused by the violent diurnal changes of temperature which for a part of the year average 120° in twelve hours?

From Digar twelve hours of most severe travelling on yaks and on foot brought us down to a shingle flat on the left bank of the

Shayok in late twilight with two servants helpless from bruises and "pass poison," one Ladaki, who in a fit of giddiness had rolled over a precipice, with a broken arm, and the Lhasa *lama* bleeding from a severe scalp wound, also from a fall. One of the baggage animals had rolled down a steep declivity, and all were so dead-beat that they did not come in till morning. Sleet was falling with a bitter wind, and we spent the night without tents or food, no amount of bonfires or of energy expended on yells or shrieks being successful in rousing the ferry men of Sati, whose pleasant lights were not a mile off. At this point travellers and their goods cross the Shayok in a scow brought from Kashmir at a cost of 400 rupees, and the animals swim. Three weeks later, lower down, the water is only two feet deep; but the snows of the ravines, under the fiery sun, were melting fast, and the river, roaring hoarsely, was a mad rush of grey rapids and grey foam. My Moslem servants, white-lipped and trembling, committed themselves to Allah, the Buddhists worshipped their sleeve idols, Gergan gripped my hands tightly. The *Gopa*, or headman, of Sati, a splendid fellow, who accompanied us through Nubra, and eight wild-looking satellites, with *chogas* girded and elf locks streaming, were the Charons of that Styx. They poled and paddled with yells of excitement, the rapids seized the scow and carried it broadside down, a plash, a leap of maddened water half filling the boat, a whirl, a united yell, and far down the torrent we were in smooth water on the opposite shore! The ferrymen recrossed, pulled our saddle horses by ropes into the river, the scow and eight frantic-looking men poling, paddling, and yelling, were hurried broadside down, and as they swept past there were glimpses above and among the foam-crested surges of the wild-looking heads and drifting forelocks of two horses swimming desperately for their lives, a splendid sight. They were landed safely, but of the baggage horses one was sucked under the boat and drowned, and as the others were too weak to face the rapids, we had to obtain other transport. A few days later the scow was smashed to pieces.

We spent three weeks among the Nubra *gonpos* and villages, among which Sati, Panamik, and Chang Lang, the highest, are the most important, crossed the Sasir Pass, full of difficulty from snow and glaciers, extending for miles, at a height of 17,820 feet, to the Dipsang Plains, the bleakest and dreariest of Central Asian wastes, with an altitude of from 15,000 to 18,000 feet, from which rises, by a gentle ascent over black gravel, the Karakorum Pass, which presents no difficulties, and returned by a slightly different route to the junction of the Nubra and Shayok. These Nubra valleys are very pleasant. Their lower levels are 2000 feet lower than the Indus valley, and between the brushwood jungles of the shingle flats, and the quantity of irrigated land (about four acres to a family), planted with loose-grained barley, wheat, peas, and lucerne, they have an aspect of fertility. Villages succeed each other every few miles, and each is an oasis. Apricot orchards with large trees abound, and these were the usual camping grounds. The largest apricot tree I saw measured 9 feet 6 inches in girth 6 feet from the ground. Strangers are welcome to eat as many apricots as they please, provided they return

the stones to the proprietor, for though a portion of the split and dried fruit is exported, the speciality of Nubra is the clear, white, and highly illuminating oil made from the kernels. In every *gonpo* temple a silver bowl, holding from six to ten gallons, is replenished with this once a year for the ever-burning light before the shrine of Buddha. This oil, sheep's wool, heavy woollens, a coarse cloth woven from yak's hair, and *pashm*, the under fleece of the shawl-goat, are the chief Nubra exports. The people are all cultivators. The men plough with the *zho*, the hybrid yak, and the women break the clods, and pull up the grain by the roots in harvest to economise every inch of straw. The soil, destitute of manure, which is dried and hoarded for fuel, produces only tenfold at the most. The people complained of the merciless exactions of the Kashmiri officials, and I believe with good reason, but there were no evidences of extreme poverty, and not one beggar was seen.

Their food is simple. They eat barley-meal porridge, cold balls of barley dough, broth, cheese, sour cream, and dried apricots. They drink and get drunk upon *chang*, a thick, dirty white barley beer, and they use brick tea, boiled with plenty of soda, afterwards churned in a special churn with an abundance of butter, and finally milled to the consistency of thin cream. The value of butter is enhanced by its age. I saw skins of it forty, fifty, and even sixty years old, which were highly prized. The headmen and richer landholders live in large three-storied houses, the lower part of stone, the upper of huge bricks. Projecting windows and wooden balconies adorn most of them. The rooms are large, ceiled with peeled poplar rods, and floored with split white pebbles set in clay. The poorer peasants occupy similar houses, but roughly built and only two-storied. The many rude rooms on the lower floors are used for cattle and fodder. In all where there is not a temple on the roof, the best room is appropriated to religious use, and invariably contains life-sized images of Shakya Thubba, Chanrazik Jamyang, and Chaz-na-doige, which are surrounded by musical instruments and symbols of power, and receive worship and offerings daily. There are *gonpos* everywhere, and long lines of *chod-tens*, miles of *manis*, prayer-mills, and rows of prayer cylinders on the roads, and flags inscribed with sacred words in Sanskrit flutter from every roof. There are processions of red and yellow *lamas*, every act in trade, agriculture, or social life needs the sanction of sacerdotalism; whatever exists of wealth is in the *gonpos*, which also have a monopoly of learning; a younger son in every family is a *lama*, and 11,000 monks, linked with the people, yet ruling all affairs of life and death and beyond death, are all connected by education, tradition and authority with Lhasa. It must not be forgotten that this Northern Buddhism, which enjoins monastic life, and usually celibacy along with it, on 11,000 out of a total population of 120,000, further restrains the increase of population within the limits of sustenance by the system of polyandry, which permits marriage only to the eldest son, the heir of the land, the bride accepting all his brothers as inferior or subordinate husbands, thus attaching the whole family to the soil and family roof-tree.

The exigencies of a severe life compel both sexes to be industrious.

The men, curiously enough, are seldom seen without the distaff in hand. The Tibetans take bright views of life, sing raspingly and inharmoniously over their work, spend a part of every winter in polo and other national games; are good-natured, full of fun, courageous, friendly, cheerful, tolerant, honest, faithful to engagements, and fairly truthful. They hate brain work, and sometimes say, "We're as stupid as oxen," in which they do not exaggerate. They are really brought up to be stupid, for they are not weaned till they are four, five, and even six years old, when they are literally crammed with barley-meal soaked in apricot oil. Children are never washed, but are diligently rubbed with animal fat. They are singularly clumsy and unhandy, and their industries are of the rudest description. Many of their feelings and ideas are akin to ours, and a mutual understanding is possible. In every village we lived among the people, the headman and principal inhabitants always coming some distance to welcome us, and escorting us to the next halt. Feasts were given in our honour, the *gonpos* were open to us, and the monks received us with blasts of their wild music, and the braying of their colossal horns, Mr. Redslob's courtesy, learning, and medical knowledge having secured friends everywhere. Nothing could exceed the helpfulness and alacrity of kindness shown by all, and there was not a thought or suggestion of backsheesh. The village men always sat round our camp fires at night, friendly and jolly, but never obtrusive, discussing local news, the designs of Russia, and what they consider as the weakness of the Indian Government in not annexing the provinces on her northern frontier.

In order to visit Lower Nubra and return to Leh, we were obliged to cross the great fords of the Shayok at Lacku at a most dangerous time, and as the *chupas*, or Government water-guides, had made nightly reports on their state, we were prepared for the final verdict, that the ford was only just practicable. All the natives concerned had made prayers and offerings for a day cloudy enough to keep the water down; but the sun was blazing, and it was noon before ten horses, all loaded high and lightly, the water-guides furnished, as all the men who accompanied us were, with long poles, and the headmen of three villages, assembled at the river bank, where prayers and offerings were made at a *chod-ten*, and the *chupas* gave us river water to drink to prevent giddiness, and begged me not to think them impolite when, for the same reason, they would frequently dash water at my face. At this spot the Shayok has eight wide branches, with shallows or shingle banks between them, and a main stream washing the left bank, the whole a mile and a half in width. Our saddle horses were led by long ropes by the *chupas*, Mr. Redslob preceding me, and four men steadied the Turkestan horse which had been lent to me, while others sounded the ever-changing river-bed far in front. As each branch grew deeper, bursts of laughter, not merriment, but excitement, wild yells, and a rising and falling chorus of *Kabadar! Sharbas!* "caution," "well done," mingled with the hoarse roar of the water, and accompanied the transit. When we halted by the main stream—a deep, fierce, swirling rapid a quarter of a mile wide—loads were tightened, the men strapped their soaked *chogas* on their heads, and

with shouts and yells and much throwing of water at faces, we plunged in, where for half-an-hour, to all appearance, the horses simply trod the rapids backwards, without making progress. The ice-cold water hurrying hoarsely was up to the men's armpits; my horse tottered and swerved several times; the nearing shore presented an abrupt bank, underscooped by the river; the men yelled louder; more frantic swelled the chorus of *Kabadar! kabadar!* there was deeper water, Mr. Redslob's strong horse leapt the bank; all the men shouted to encourage mine; he made a desperate effort, but fell short, and rolled over backwards into the Shayok, with his rider under him. A choking struggle, a moment of suffocation, and the *gopa* of Sati and several other Tibetans dragged me out from under the horse and up the bank. I escaped with a broken rib and some severe bruises, but the horse was drowned. The following day some men and animals were carried away, and after that the ford was impassable for a fortnight. Enough of personal adventures! Such risks are among the amenities of the great caravan route from India into Central Asia.

Hundar and Deskyid are the most interesting of the Lower Nubra villages from their picturesque situations and their imposing *gonpos*, the Deskyid *gonpo* being a vast irregular pile on a spur of rock 2000 feet above the village, its temples, towers, storehouses, cloisters, galleries, balconies, surmounted with flags, tridents, and yaks' tails, rising 300 feet one above another. As in the many monasteries I visited in Ladak and Nubra, we were welcomed at the top of a thousand rock-cut stairs by beating of gongs and blasts of horns, and were conducted by the abbot through seven temples, one above another, the lowest a type of the infernal regions, where in dim recesses were rows of demon gods, hideous beyond conception, engaged in torturing writhing and bleeding specimens of humanity. Demon masks hung from the pillars, naked swords were wielded by motionless hands, there was the revolting two-horned and three-eyed image of Kali, and in the chief recess that indescribable horror, the executioner of the Lord of Hell, holding instruments of torture in his many brandished arms, and before him the thunderbolt and sceptre, the holy water, the baptismal chalice, and the ever-burning lamps. Monks waved censers, and blasts of unearthly music woke the subterranean echoes. In this temple of Justice the younger *lamas* spend some hours of every day. In the highest temple, that of Peace, Shakya Thubba and the Buddhist triad sat in endless calm. In a chapel full of monstrous images and medallions made of the ashes of holy men the sub-abbot was discoursing to the acolytes on the religious classics. In the Chapel of Meditations, among lighted incense-sticks, monks seated before images were telling their beads with the object of working themselves into a state of ecstatic contemplation, for there are undoubtedly devout *lamas*, even though the great majority are idle and unholy. There are great facilities for the study of Northern Buddhism in Nubra, and its close connection with Lhasa has a special interest. All the larger *gonpos* have their prototype in Lhasa, all ceremonial has originated in Lhasa, and every *lama* receives from five to seven years' training in the learning only to be obtained in Lhasa.

A fall of snow, by roughening the surface of the ice, enabled us to

return to Leh over the Khardong Glacier, the friendly *gopas* sending up men to cut and gravel ice-steps for the baggage animals. The mercury fell to 15° Fahrenheit, with a bitter wind, at the glacier foot where we camped the previous evening, and Mr. Redslob never recovered the hardships and inclemency of that night. The ascent and descent of the pass on yaks occupied thirteen hours.

After a fortnight in Leh, taking twelve days' provisions for my party, and two yaks loaded with hay ropes and barley for my horse, I made the journey to Lahul in seventeen marches, ten of which were over lofty ranges and plateaux, with little water, no supplies, and such scanty vegetation that the baggage animals were twice without food for twenty-four hours. Crossing the Indus, and visiting the discrowned and pensioned *Gyalpo* in his picturesque castle at Stok and the magnificent monastery of Hemis, the richest in Ladak, with its three hundred *lamas*, I left the Indus at Upschi, and in another march embarked on the deserts of Rupchu, on which, for ten marches, the only traces of man are a few rude dykes for shelter from the wind, and tracks, not always very legible, made by the passage of caravans. Between Gya, the last hamlet in Ladak, and Darcha, the first in Lahul, are three huge passes, the Tog Lang, 18,150 feet, the Lachalang, 17,500, according to Major Trotter, and the Baralacha, 16,000, all easy, except for the difficulties arising from the highly rarefied air. The region is made up of somewhat shapeless mountains, with surfaces of disintegrated rock, from 20,000 to 23,000 feet in height, but only from 3000 to 5000 above table-lands or plateaux, rarely exceeding 6 miles in width, which have an elevation of from 14,000 to 15,000 feet. By the springs and streams and on a few hill-sides there is some scanty vegetation, chiefly aromatic herbs; but, on the whole, Rupchu is a region of arid gravel. On two days of my journey the solar temperature reached 152°, there were from two to five degrees of frost each night, and at daybreak on August 24th the snow lay three inches deep round my tent.

Rupchu has 500 inhabitants, pure Mongolians, nomads, and dwellers in tents, and I made a detour of some days in order to visit them. A few miles from their camp a cloud of horsemen appeared on the crest of a hill, rode furiously towards me, threw their wiry Tartar horses on their haunches, jumped to the ground, which they touched with their foreheads, presented me with dried apricots, vaulted into their saddles, dashed off at full speed to their tents, returned at a gallop throwing spears, performed wild feats of horsemanship, escorted me through a river, pitched one of their own low tents for me, arranged it with handsome rugs, made great bonfires of Tibetan furze, insisted on my visiting every one of their forty tents and on mounting my servants for the next day's march, and the chief and thirty horsemen escorted me out of the valley. I must explain that the cordiality of my reception was due to a letter from Mr. Redslob of the Moravian Mission, to whom these people were deeply grateful for several advances of money for their tribute, which in every case they had repaid more than punctually. I was indebted to them for everything, for the muleteers with the baggage had lost the way, and did not reappear for two days, during which

time I saw patriarchal life at its simplest and kindliest. These Chang-pas divide into two camps in the summer, and usually make four annual migrations. Their tents are of black hair-cloth; they revel in the severity of their climate, and are healthy and long-lived. They have much wealth in shawl-goats, yaks, and sheep, all of which are used for transport, specially by the Rudok and Lhasa traders. The Chang-pas practice polyandry and are Buddhists, but owing to the scarcity of fuel they do not burn their dead, but expose them, with religious rites, face upwards, to the fowls of the air.

The rest of the desert journey was only enlivened by the near view of herds of the *kyang*, the wild horse of some naturalists, the wild ass of others, graceful and beautiful creatures, grazing within gunshot of the track without alarm. Sheep caravans were common. In one day I passed 7000 of these animals, each carrying on a pack saddle two neat leather bags of salt or borax, which, together with the unshorn wool, are exchanged for grain at Patseo in Lahul. The load varies from 25 to 32 pounds, and the journey from Chinese Tibet and back again takes nine months. There is one man to every hundred sheep, short, broad, wild-looking fellows, bare-headed, with thick locks waving in the wind. They sing wild chants as they picket the sheep in long, double lines at night, and sleep under the frosty skies, under the lee of their piled-up saddle bags.

The later marches after entering Lahul are grand beyond all description. The track scaffolded or blasted out of the rock, from 1000 to 3000 feet above the thundering Bhaga, is scarcely a rifle-shot from the mountain-mass dividing it from the Chandra—a mass which is covered with a nearly unbroken ice-field, out of which rise pinnacles of naked rock 21,000 and 22,000 feet in height. The region is the abode of snow, and glaciers of great size and length fill up every depression. Humidity, vegetation, and beauty re-appear together, wild flowers and ferns abound, and pencil cedars in clumps rise above the artificial plantations of the valley. Wheat ripens at an altitude of 12,000 feet. Picturesque villages, with orchards and fields, adorn the mountain spurs. *chod-tens* and *gonpos*, with white walls and fluttering flags, brighten the scene, feudal castles crown the heights, and where the mountains are loftiest, the snow fields and glaciers most imposing, and the greenery densest, the village of Kylang, the most important in Lahul as the centre of trade, government, and Christian missions, hangs on ledges of the mountain side 1000 feet above the Bhaga, whose furious course can be traced far down the valley by flashes of sunlit foam.

The Lahul Valley itself has an altitude of 10,000 feet. This district of British Tibet prospers under British rule; its population has increased, Hindu merchants have settled in Kylang, the route is finding greater favour with the Panjābi traders, and the Moravian missionaries, by a bolder system of irrigation, and the provision of storage for water, have largely increased the quantity of arable land. The people of Lahul are chiefly Tibetans, but Hinduism is much mixed up with Buddhism in the lower villages. All the *gonpos*, however, have been restored and enlarged within the last twenty years. In winter the snow lies 15 feet deep,

and for five months, owing to the perils of the Rotang Pass, the valley rarely has any communication with the lower world.

So fascinating is Kylang that I camped there for three weeks, till the harvest was brought home with joy and revelry, and the flush of autumn faded, and the first snows of winter gave an added majesty to the glorious valley. I spent five weeks on the descent to the Panjāb, journeying through Upper Kulu, and the interesting native States of Mandi, Sukket, Bilaspur, and Baghat, and early in November reached the amenities and restraints of the civilisation of Simla *en route* for Persia and Khurdistan.

A NEW CHART OF THE CURRENTS OF THE NORTH ATLANTIC.

(*Read at Meeting of British Association*, 1892.)

By H.S.H. Albert, Prince of Monaco.

(*With a Chart.*)

During the years 1885, 1886, and 1887, I made several series of experiments upon the superficial currents of the Atlantic in my sailing yacht *Hirondelle*. In 1885, as a preliminary trial, 169 floats were launched at intervals along a line 170 miles long, in the direction of N. 14° W., from a point situated 110 miles NW. from Corvo, one of the Azores. These floats were of three different types—wooden casks, copper globes, and glass bottles. They were all weighted in a manner to prevent any part of their bulk emerging from the water and catching the wind. This first experiment having given some useful results, a further experiment was made on a larger scale in the following year. On that occasion 510 floats were launched at intervals along a line nearly on the meridian of 17° 40′ west of Greenwich, 510 miles long, between 42° 34′ and 50° N. latitude. The object aimed at by these experiments having been largely attained, I made a third and much more extended set of observations during the year 1887. This time 931 floats of thick glass, covered with copper, with an intermediate coat of pitch, were launched along a line extending from the Azores to the Grand Banks of Newfoundland. On returning from this voyage, a little group of floats was again launched on a length of 128 miles between the two following points, viz., lat. 49° 31′ N., long. 29° 7′ W.; and lat. 48° 58′ N., long. 26° 7′ W. Each float contained a document printed in nine languages, which invited anybody who might find one of the floats to deliver it into the hands of the nearest maritime authorities, to be sent to me with detailed indications of the place and date of finding it.

Of the floats which had been thus launched in four different parts of the North Atlantic, 227 were sent back to me, and I have carefully studied their history. This has furnished me with valuable indications, not only of the direction, but also of the speed of the current, and I have already laid successively several accounts of them before the Academy of

Sciences in Paris, which has published them in the *Comptes Rendus*. Finally, at the commencement of the present year I published a chart of the currents of the North Atlantic, entirely based upon the results of these experiments.

The following table shows how the floats were distributed upon the coasts washed by the Atlantic:—Azores, 37; Madeira, 6; Canaries, 21; Iceland, 3; Norway, 22; British Islands, 29; France (West), 36; Spain (North), 14; Africa (West), 7; Antilles, 23; Central America, 1; Bermuda, 4; open sea, 3; various, 5. The study of these facts furnishes us with the following information upon the direction and speed of superficial currents.

Velocity of Current.—In order, in a general way, to arrive at the velocity of the current, I have divided the vortex traced out by the floats into sections, the limits of which are, first, the lines of origin of the different series of experiments, and the coasts where the first floats of the same series of experiments have appeared in groups, and within a short interval of time; then these coasts, and certain points of the coasts following, on which floats having the same origin have stranded successively in the order in which they have been launched.

Direction of the Current.—In 1889 I pointed out that the recovery of two floats in the open sea, south-west of the Azores, a very few weeks after they had been thrown overboard to the north-west of these islands, demonstrated that the internal edge of the great vortex, traced out by the whole of the floats, performs a revolution with a very short radius round a point to the SW. of the Azores, and not very distant from them. Just as in an atmospheric cyclone, there exists in this oceanic vortex a region of calm, where the waters do not follow any regular direction, and when the floats enter this region they remain there often for months or years.

The stranding of floats successively on the Azores, on the coasts of Europe, Africa, Central America, the West Indies and Bermuda in the course of a normal period; then the repetition of this same circuit, indicated by the 4 floats recovered in 1891 (2 on the coast of France, after being afloat for 4 years 3 months and 5 years 3 months respectively; and 2 on Madeira, after a voyage of 3 years 11 months and 4 years 2 months respectively) enables us to establish the fact that the cycle, described by the objects drawn into the vortex of the waters of the North Atlantic, is renewed indefinitely, except in the case where they escape by an off-shoot into the Arctic regions along the coasts of Ireland, Scotland, and Scandinavia. This conclusion is arrived at by comparing the dates of the launch and recovery of these 4 floats, and applying to them the mean velocities deduced from the voyages of the earlier floats, as set forth in a table.

The indications which I thus obtain by following the floats from one station to another, round the Atlantic, are sufficiently good to permit me to offer figures which must be approximately exact.

The unpublished table which summarises these facts shows:—

1. The geographical and annual distribution of all the floats recovered. 2. The mean velocity of the first floats, recovered from

each series of experiments. 3. The number of floats used for the establishment of these means; and, 4. The total number of floats recovered in each district, and from each series of experiments.

In each section a certain number of the floats recovered has been rejected, because their late appearance indicated accidental retardations of unknown duration at one or more points of their course.

In some cases, a single float belonging to one series of experiments is accepted as furnishing the mean of a section, because the rate which it indicates does not differ materially from the mean rate deduced from the two other series of experiments for the same section.

The velocities which may be accounted most accurate are those furnished by floats recovered on thickly populated coasts, because they are sure to be secured without much delay, either being entangled in fishermen's nets, or picked up by boats or by persons on shore. And in fact it is on such coasts that we observe the smallest amount of variation in the velocities of the floats which have appeared, and for the same reason a greater number of them are available for the deduction of means. This is the case for the coasts of Madeira and the Canaries, which are always surrounded by fishing boats; for those of Portugal and Spain as well as for Ireland and Scotland. The same remark is applicable to the coasts of Morocco as far south as the Sahara, but here it is due to the custom of the miserable tribes of the country who continually visit their extensive beaches in search of wreckage.

In the West Indies and in Norway the great extent of the coast-line, as compared with the population, produces a contrary effect. The three floats recovered from Iceland have not been utilised, because the scarcity of population is still greater there.

I cannot utilise for the determination of the mean velocities the four floats recovered in Bermuda whose voyages have lasted years; but, taken along with those picked up in the open sea to the west of the Azores, they have aided me in recognising the inner border of the oceanic vortex, and have helped me to understand why many floats which have disappeared for a long time have afterwards appeared near to these same Azores, and even, although more rarely, in Europe.

Floats which have been exceptionally long at sea have been excluded from participation in the establishment of means. On the other hand I have applied to them the general mean velocity found from the whole of the sections, and I have laid down on the chart their courses, by lines drawn parallel to the curve of general circulation and connecting their points of origin and of recovery, and of a length given by the mean velocity multiplied by the number of days that they were afloat.

The mean velocity for the region comprised between the Azores, Ireland, and Norway is 3·97 nautical miles in twenty-four hours; between the Azores, France, Portugal, and the Canaries it is 5·18 nautical miles in twenty-four hours. From the Canaries to the West Indies, the Bahamas, and even to Bermuda it attains 10·11 nautical miles in twenty-four hours. In the eastern portion of the arc which extends from Bermuda to the Azores it falls again to 6·42 nautical miles in twenty-four hours. The mean velocity which the combined results give for the North Atlantic is 4·48 nautical miles in twenty-four hours.

It is apparent that circulation is more active on the western half-circle of the vortex than on the eastern one; and this is explained by the combined action of various causes, as the trade-winds, the equatorial currents, and the Gulf Stream, also the powerful evaporation which in the Tropics stimulates the circulation of the waters, as by the increase of density it always tends to re-establish equilibrium. It would now be of great importance to renew these experiments at different seasons.

METEOROLOGICAL OBSERVATORIES IN THE ATLANTIC OCEAN.

(*Read at Meeting of British Association*, 1892.)

By H.S.H. Albert, Prince of Monaco.

Attentive observation of the progress made by Meteorology in the last fifty years, along with the reflections suggested by my own work in the field of Oceanography, have led me to conceive a plan which, if carried out, will, I feel convinced, have a very great effect in furthering the advancement of these sister sciences.

Maury's researches on the laws of the winds furnished information of so practical a nature regarding the best track for sailing ships, that navigators were able at once to save half of the time that had been formerly required to make the passage from the United States to the Equator. Since then, and principally owing to the labours of Fitzroy, Leverrier and others, a network of observatories, which now covers all Europe, has been developed, and informs us of the simultaneous variations in the state of the atmosphere, thus enabling us to advance a certain distance in forecasting the weather. Similar observations, collected at the Weather Bureau in Washington, enable us at times to be warned of great atmospheric disturbances advancing towards us. Information, collected by the same office, from the multitude of ships which enter the ports of the United States, enables it to publish each month a *Pilot Chart*, of the greatest interest alike to mariners and meteorologists, which gives the position of the icebergs, cyclones, and wrecks met with at sea during the preceding month. It does not, however, confine itself to recording past events. By the skilful use of the large amount of material brought together, it indicates for the current month the probable limits of the fogs in certain regions of the Atlantic, and of the ice in the neighbourhood of the North American coasts; it shows also the probable direction of the winds on the whole Atlantic.

But the Atlantic is too vast a region for it to be possible to predicate what is going on in its centre from observations made on its borders; and observations made at sea, which sailors bring home, often arrive too late to be of use for forecasting. We are therefore at present very imperfectly warned of what the sea is preparing for us.

If we consider this question more closely, remembering how great

is its practical importance to maritime nations, and keeping in view the great advances in scientific methods and instruments, we shall find that places where the requisite operations could be easily made and utilised exist in some very favourable positions in the ocean. Bermuda, the Azores, the Canaries, and the Cape Verd Islands, are already, or will be shortly, connected with the Continent by telegraphic cable. It would, in the first instance, be sufficient to establish on some suitable spot in each of these groups of islands an observatory furnished with the instruments necessary for noticing the first appearance, the nature, and the march of those disturbances, which cannot be followed from the borders of the ocean.

The Cape Verd Islands have an especial interest, because they lie in the neighbourhood of the Tropic, and on the parallels where the most important cyclones are generated, which, after traversing the Atlantic, finally spend their violence on the British coasts. They have this further element of interest, that the great circulating current of the surface waters of the North Atlantic Ocean, the existence and nature of which have been confirmed by my experiments with floats, passes close to the north of them, but without touching them. Two of these islands are already in telegraphic communication with each other and with Europe.

Bermuda also forms a very useful point of observation, because it lies almost on the other extremity of the arc of the circle, along which the North Atlantic cyclones pass, and near to the meridian where they most frequently curve back and direct themselves towards Europe. Bermuda is in direct telegraphic communication with North America and Europe. Observations are already made there, but are not telegraphed to Europe.

The Azores are situated not far from the centre of the same circle, which is also that of the great vortical circulation-current of this part of the ocean. A submarine cable, to connect the Azores with Portugal and with America, is at present under construction, and will shortly be laid.

Madeira occupies a position in the neutral zone, which separates the trade-wind regions from those of the south-westerly winds of higher latitudes.

As this region shifts with the season, this island belongs sometimes to the one region and sometimes to the other. Madeira is connected with Portugal by a duplicate cable.

The Canaries lie in a region, where the trade-winds take their rise, and prevail during the greater part of the year. Three of these islands, namely, Tenerife, Grand Canary, and La Palma, are connected with one another, and with Europe, by submarine cable.

With the exception of Bermuda, all these islands have localities suitable for high-level observatories, which, if established and kept going for only a single year, would help greatly to put the meteorology of the North Atlantic on a sure and scientific basis.

In the Azores there is Pico, 7613 feet, Madeira has an elevation of 6056 feet, Tenerife over 12,000 feet, and in the Cape Verde the island of Fogo 9760 feet. I consider that in several of these mid-Atlantic stations, where a certain number of ships and steamers call, it will often be possible to complete the daily meteorological information, with

observations gathered by the said ships in the surrounding region during twelve hours before their arrival. The information would thus concern not only a spot, but a radius of perhaps one or two hundred miles.

With regard to the execution of the project, I should suggest the following general lines: The points selected would be, Bermuda; the Azores, with an observatory at the sea-level at Fayal, and one on the summit of the mountain Pico, in the neighbouring island; the island of Madeira; the Canaries (Tenerife); and one on the Cape Verds, with an auxiliary station on Fogo summit.

Great Britain might undertake the installation and maintenance of the observatory in Bermuda.

The other observatories should be supported at the joint cost of the nations most interested.

At each observatory the staff should consist of an observer and one assistant. The observations ought to include barometer, hygrometer, thermometer, wind, and clouds.

As the observations would belong to an altogether distinct category, it would be well that they should be transmitted in the first instance to an observatory or establishment devoted to their special consideration; and I am willing that they should be collected at Monaco, where the Government will undertake their discussion, publication, and distribution.

Shortly, my plan is this. The western shores of Europe, especially those of Great Britain and Ireland, are exposed to continual devastation by storms which come from the westward. The only source from which we obtain warnings is the continent of North America, and the warnings thence received are of considerable value. But the width of the North Atlantic is so great that American storms lose themselves, and others are generated of which Europeans, under present circumstances, can receive no warning. The American *Pilot Chart* supplies abundant evidence that there are many destructive storms which devastate our coasts, of which ample warning could be given if we were in telegraphic communication with a well-organised meteorological observatory in the Azores. The admirable observations made by Piazzi Smyth on the Peak of Tenerife, in the summer of 1856, give most valuable hints in connection with the establishment of observatories such as we have under consideration. The conditions, as regards temperature and humidity, would be quite distinct on the summits of all the islands named from the conditions at sea-level. As regards the winds, it is possible to speak with certainty only about the loftiest, that is the peak of Tenerife. Even its summit is not always above the upper level of the trade-winds. The summit of Fogo (9760 feet), judging from Smyth's observations at his intermediate station, Guajara (8843 feet), would lie very near the surface, separating the lower and the upper systems of circulation. It is probable that both the summit of Madeira and Pico in the Azores would be more often in the lower than in the upper system. But the observations on Ben Nevis show that, for purposes of weather-forecasting, this would be rather an advantage than otherwise. The results already given by the discussion of four years'

observations on Ben Nevis justify the confident expectation that similar high-level observations in the middle of the Atlantic would give results of equal, and probably much greater, importance for useful and timeous weather-forecasting.

It is with great satisfaction that I find myself able to inform the British Association that the French Submarine Telegraph Company, the contractors for the line between the Azores and Europe, are bound by the terms of their concession to transmit daily three free telegrams of ten words each from the Azores to Europe, and in the opposite direction, and a like number between the Azores and North America.

I propose that next winter delegates chosen by the nations interested should meet at Monaco to discuss this important question, each of them bringing the help of his experience.

THE TRIBES OF MASHONALAND AND THEIR ORIGIN.

(*Read at Meeting of British Association*, 1892.)

By J. Theodore Bent.

The inhabitants of the newly-opened-out country in South Africa, which has somehow or other got the name of Mashonaland, are an oppressed and impoverished race of Kaffirs, raided upon by Zulus, on the one hand under Lobengulu, and on the other hand under Gungunyana.

They now dwell amongst the rocks and crannies of the mountains, whither they flee at the approach of the enemy, and look down upon the destruction of their homesteads and the robbery of their cattle. They are obviously a race which has seen better days, retaining amongst them traces of a higher civilisation in their skill in smelting iron, their carvings and ornamentations, their musical instruments, and many other kindred points.

During our stay amongst them last year for a period of seven months we had an opportunity of closely studying their characteristics, the chief points of which I propose to place before you in this paper.

From the Lundi river on the south, and indefinitely northwards towards the Zambesi, the inhabitants, though of different tribes, all call themselves by one race-name, and this name is *Makalanga*. "You will find many Makalanga there," was the encouraging reply to inquiries when we started off on our trip to the Sabi river, an unexplored region. "A Makalanga is buried there," and phrases such as this are common to the countries ruled over by Chibi, Guto, Gambidji, and 'Mtigeza, where they are all known as Makalanga, the probable derivation of which name is *Ma-ka-langa*, an Abantu word signifying "children of the sun." This name did not convey much to me until, on my return to civilisation, I read the works of early Portuguese travellers, and in the account of Dos Santos, written 300 years ago, who, by the way, is almost the only Portuguese writer on the subject of this country who does not indulge in extravagant exaggerations, I found, to my astonishment, the following

statement, "All these Kaffirs they call Mocarangas, because all talk the Mocaranga language;" and again, "The Monamatapa and all his vassals are Mocarangas, a name which they have because they live in the land of Mocaranga, and talk the language called Mocaranga, which is the best and most polished of all Kaffir languages which I have seen in this Æthiopia."

Here we have the same name as Makalanga by substituting, as the Portuguese always did, *r* for *l*, as, for example, *Umtare* for *Umtali*, *branco* for *blanco*, and innumerable similar instances. Couto, another Portuguese writer, also bears testimony to the same fact, and Father Torrend in his recent work on the Abantu races. Hence we can fairly assume that the Makalangas are the descendants of the once powerful organisation known in the sixteenth century as the Empire of Monomatapa, a powerful Kaffir organisation like the Zulus of to-day, which fell to pieces first of all by internal dissensions, as Dos Santos tells us, and finally became a prey to the Zulu hordes who fell upon them. In 1720 a tribe of Bakalangas entered Natal with traditions of having once belonged to a powerful tribe further north. Hence the country should be called Makalangaland.

Antonio Bocarro, chronicler of the affairs of India, in his thirteenth decade gives us a good account of the Monomatapa, and mentions *Mangwendi* as the "chief wizard," *Chirburga*, the majordomo who keeps the city where dwells Mazarira, the king's great wife, and *Makoni*, king of Maungo, as the chief vassals. Now, Mangwendi is still the dynastic name of one of the great chiefs to the north-east. *Chirburgwe* is the frontier outpost on a great mountain of the Makalanga in the Sali direction, and Makoni, chief of a tribe still called the Maungo, is still one of the most powerful potentates in the north-east. In the districts occupied by Mangwendi and Makoni, which we travelled through, we found traces of fortified hills and towns long since fallen into ruins. These I unhesitatingly attribute to the Monomatapa dynasty, a heritage of stone building derived from the ancient races who visited Mashonaland in search of gold.

Taking Dos Santos as our most reliable guide, we find the descriptions given by him of the Makalangas of Monomatapa of his day corresponding exactly to the habits and customs of the present inhabitants with whom we came in contact. He tells us of the annual sacrifice to the manes of their ancestors, the intercessors for them between God and man, the formal ceremonies of clapping of hands, the beer drinking, the iron smelting, the Mashona piano, the weekly day of rest during the ploughing season, and many other minor customs which identify them beyond all doubt with the people of to-day.

Hence, I think, we may without a shadow of doubt consider the Makalangas of to-day as the lineal descendants of the powerful Monomatapa tribe, which possessed the whole of this district for centuries prior to the descent of the more powerful Zulus, who annihilated the quasi-civilisation existing here at the time shortly after the Portuguese rediscovered this country at the close of the fifteenth century.

For the origin of this race of Makalangas and the growth of the Monomatapa power we are naturally much more in the dark, yet certain

Arabian authorities are fairly explicit on the subject, and prove to us that barbarous tribes similar in habits and customs inhabited this gold-bearing region as far back as the ninth century A.D. The authorities I have been able to avail myself of on this subject are El Masoudi, justly called the Herodotus of Arabia, Zaneddin, Abou Zeyd, and the travels of two Arabians in 851 A.D. translated by M. Renandot. These authorities agree wonderfully in their descriptions of the wild Zendj race which at that early period inhabited the gold country west of Sofala, where the Arab ships regularly traded for the precious metal. Masoudi relates the descent of those Zendj tribes from the north on to this region, which may probably be taken for the epoch at which the earlier civilisation was destroyed, which built the Zimbabwe ruins and the other ruins in the district, unless there was an earlier descent of savage tribes of which we have no record.

From the descriptions given by the above-mentioned authorities of the manners and customs of these tribes, we recognise certain salient features which connect them with the present race. They describe to us the tribal witch-doctor, the ancestor-worship which is still carried on, their methods of catching game, the filing of their teeth, and numerous minor customs indubitably connecting them with the present race. Hence it is very clear to us that the country now called Mashonaland has been inhabited for at least a thousand years by the ancestors of the present barbarous race—a race which at one time became powerful and quasi-civilised owing to their intercourse, doubtless, with foreign traders, but which during the later centuries have fallen again into their natural state of barbarism.

It is impossible in the limits of this paper to go into anything like detail concerning the anthropology of this race—their customs and habits, as we saw them during our stay in their country. I will confine myself, therefore, to one point, namely, the various existing customs amongst them which connect this people with external races, and point forcibly to a Semitic influence having been exercised upon them.

Firstly, in connection with their chiefs and their succession. Each chief in Mashonaland, whether great or small, paramount or vassal, has a dynastic name or tribal appellative, which he assumes on inheriting the chiefdom, dropping the name by which he was previously known. Such names as Mangwendi and Makoni, to which I have already alluded, M'toko, Chibi, and a hundred others which I could name, are all dynastic, and are used just as the name Pharaoh was used in ancient Egypt, and continue for centuries, as we see in the two first-mentioned instances. This was the case with the name Monomatapa, assumed by the successive heads of that race. Then, however, they appear to have retained their own name also, as certain treaties entered into with the Portuguese are signed with the mark of Monomatapa Lucere and Monomatapa Gazzero. The term Monomatapa varies in different Portuguese writers between Muenematapa, Benomatapa, and Monomatapa. Muene and Ben distinctly mean "lord of," and Matapa is a very probable name for a chiefdom. In Livingstone's time there was a very insignificant Monomatapa still ruling in the neighbourhood of the Zambesi.

A curious instance of inheritance on Semitic lines comes to us from

Bechuanaland, a little south of the country with which we are dealing. Pilans was lately chief of the Masupa tribe, near Kanya, and he claimed the inheritance in this wise. The eldest son of the chief died young, when betrothed to a girl, who afterwards married the second son Moshulila; their eldest offspring was Pilans. On coming of age Pilans turned his father out of the chiefdom on the grounds that he had only been instrumental in raising up seed to his elder brother, the direct heir, and Pilans effected his unfilial purpose without a murmur from the tribe. I have no doubt that when the Makalangas are better known, similar instances will be found amongst them, for they have very curious and distinctly Semitic ideas anent the laws of succession.

Each of the Makalanga tribes has its totem; in M'toko's country it is the lion, into which the spirits of their ancestors are supposed to go, and this animal is believed to fight for them in battle. To the lion they sacrifice annually, and the chief priest of the tribe is called the lion-priest, the *mondoro*. Other tribes have the crocodile, the leopard, and so forth. Totems of similar nature were found, as Professor Glaser demonstrates, amongst the tribes of Southern Arabia in remote antiquity.

In religion the present inhabitants of Mashonaland are distinctly Monotheists; they believe in one god, whom they term *Muali*, a great and mysterious personage, unapproachable by mortals; so they have elected as their intercessors the *Mozimos*, or spirits of their ancestors, to whom they sacrifice annually, and offer prayers for their well-being.

Whilst excavating at Zimbabwe we came across another instance of sacrifice. We found the skeleton of a goat in a cave, tied down to one of their household mats, and the knife with which the goat had been killed by its side, still bearing traces of the hair and skin on it. We learned that they are in the habit of thus sacrificing a goat in the hopes of warding off some pending calamity, such as war, pestilence, or famine from the community.

The Makalangas bury their dead on mats, probably the mat on which the individual slept during life. By his side they usually place pots containing beer and food, instances of which we constantly came across during our excavations amongst the ruins; this fact, together with the customary wailings over the dead, and the horrible beating of the drums, forcibly recall to mind scenes of a similar nature which we have witnessed in the East.

The existence amongst the Makalangas of a day of rest during the ploughing season is very curious; they call it Muali's or God's day. In Mangwendi's country the chief ordains it, and orders that his tribe abstain from work on every sixth day during the period of industry. This day is invariably employed by the men in drinking beer and lying about idle on the rocks. When an individual wants any work done he makes an unusually good brew of beer, and summons his neighbours to help him. Hired labour is unknown amongst them; in a similar co-operative fashion work is done still in many of the remote parts of the Turkish empire.

Circumcision is found amongst some of the tribes; the rite is performed when the youths are initiated into the tribal mysteries and formed into regiments according to their years.

Such are amongst the more important public functions which would seem to connect the Makalangas of South Africa with an Asiatic origin, and they are so marked that I have heard men of otherwise great common sense affirm that the lost tribes are to be found here. However, it is sufficiently obvious that these customs came rather from actual intercourse with Arabia or from northern hereditary instincts handed down by the conservatism of all barbarous communities. That during the middle ages there was constant intercourse with traders at the coast, who came here for gold, is proved by the finding amongst the ruins of Zimbabwe fragments of old Arabian glass, Persian and celadon potteries, beads of Egyptian origin, and amongst the tribes now one constantly sees strings of old Venetian beads, which must have been many centuries in the country.

In private life, also, there are some very curious additional testimonies to this northern influence. The wooden pillows, of which every Makalanga has one on which to rest his decorated head at night, are exactly the same in shape and execution as the wooden pillows found in ancient Egyptian tombs, specimens of which are to be seen in the British Museum. These pillows are found also amongst other tribes in South Africa, and point to a northern influence.

The universal game amongst the Makalangas is one called by them Isufuba. It is an exceedingly perplexing one. Outside the village on a level space thirty-two holes in rows of four are made in the ground. Around these sometimes as many as ten men group themselves, moving from hole to hole small stones or bits of potsherd in what, to us, was an unaccountable manner. The game is evidently closely akin to a game played in India with beans and holes in a wooden platter. It is also found on the west coast of Africa, and, I am told, is generally found where Arabian influence has been felt. In this part of Africa, however, it is peculiar to Mashonaland, and the inhabitants of this country are considered far better calculators and arithmeticians than any of their neighbours.

The common drink of the country is the Kaffir beer, made of millet meal; it is called in some parts of the country *doro*, which is also the name given to the same beverage in Abyssinia. This drink was in common use in Egypt and Asia Minor in classical times, and Xenophon mentions how he and the ten thousand drank of it in villages in the mountains of Armenia.

At an *indaba* or conclave beer is brought in on bended knee by the chief's wife, who has brewed it. She sips first, then the chief, and then his headmen, before it is handed to the stranger, to prove that it has not been poisoned, a custom of common occurrence also in the East.

Thickened or sour milk is actually called by the same in Mashonaland as it is in Arabia and Persia, namely *mast*, and forms here, as it does there, a principal article of food.

The so-called Mashona piano, consisting of over twenty iron notes fixed to scale on a square piece of wood, and played on a calabash to bring out the sound, has its parallel to-day in Nubia and Lower Egypt; the Makalanga are decidedly a musical race, and easily pick up tunes to play on this instrument; every chief has his private musician, who plays at all the public entertainments and dances.

The iron skin-scraper commonly used by the Kaffirs in lieu of a pocket handkerchief, is in shape and utility the counterpart of the ancient strigil, having exactly the same curve as those that have come down to us from Greek and Roman days. All these iron things they make for themselves, and they also manufacture their assegais, battle-axes, and the iron sceptre, which is the insignia of every Makalanga chief, out of the ore found in their own mountains. This art is undoubtedly a heritage from some higher state of civilisation.

Finally, as to type of countenance, the Makalanga is far the most refined of any of the Kaffir races I have seen; the thick lips, snub nose, and large nostrils, so characteristic of the Bechuana, the Zulu, and other South African races, is the exception and not the rule amongst the Makalanga. Many of them have thin lips, aquiline noses, and delicate features; their manners are courteous in the extreme; some of the chiefs whom we visited received us with the grace and dignity of an Arab sheikh; when we gave a present, however small, the recipient would touch the dust before taking it into his hands. If he is a cowed and cowardly man, the Makalanga is refined, and gives ample evidence of his once having been in a superior state of civilisation, and having had intercourse with more civilised races.

Of course this country has been so lately opened out that at present the data we have to go upon are limited. The Makalanga are extremely reserved about their customs and their religious observances; few, if any, have as yet mastered their language. But in the immediate future there is here open to the anthropologist a most interesting and profitable field for research.

SOME FEATURES OF THE RUINED TEMPLES OF MASHONALAND.

(*Read at Meeting of British Association*, 1892.)

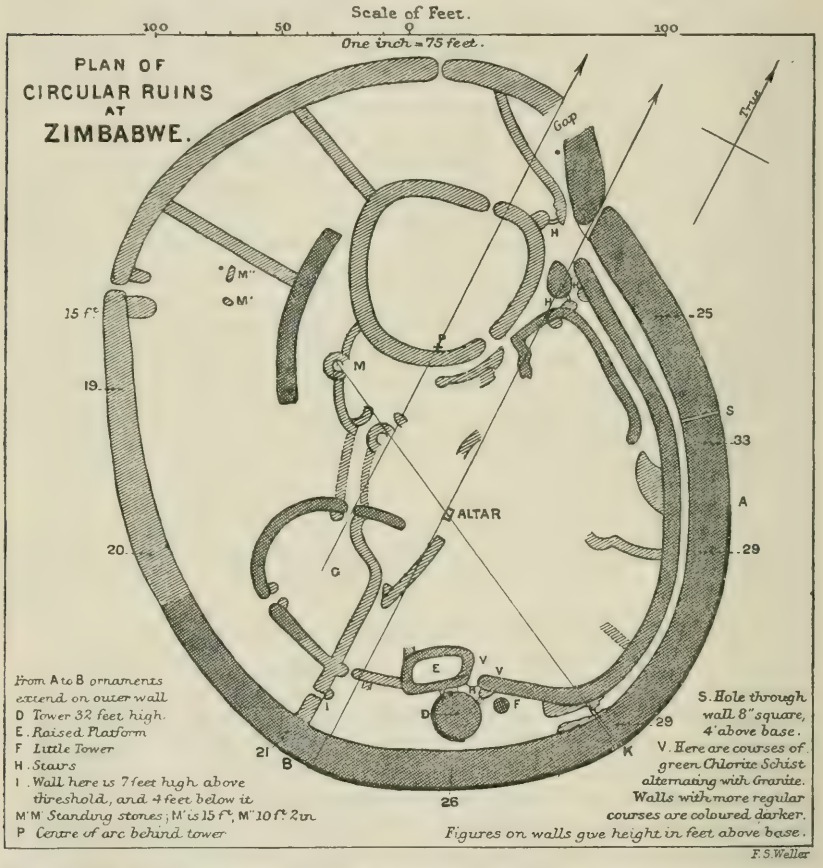
By Robert M. W. Swan.

A glance at the plan of the great temple at Zimbabwe suggests that the builders had carelessly drawn an ellipse on the ground and built round it; but when one observes the very careful nature of the masonry of the best-built walls, and the great accuracy with which the comparatively rough stones have been laid in regular courses and fitted together, then one expects to find that the form of the temple has been carefully designed; and when a plan of the whole has been made it is seen that the well-built portion of the outer wall and some of the inner walls are built on a series of carefully constructed curves. These curves are all arcs of circles, and their radii all have a peculiar relation to the diameter of the most important feature in the great temple—the round tower itself.

I must premise that what I have to say will only apply to the well-built walls in the temples—that is, to those which have been darkly shaded on the drawings. These are all made with carefully levelled courses, and are well built throughout, while in the poorly built walls the courses are much less regular and often do not exist at all, and the interior of those

walls is composed of carelessly filled-in stones. Those walls are much inferior in every way to the others, and were probably built at a different period and by a different race; so it is not surprising that they do not show evidence of a similar design.

The forms and relative proportions of the two towers are remarkable, and seem to offer an explanation of the forms of the curves of the walls; in fact, the diameter of the great tower at the base seems to be the unit of measure used in the construction of these curves. This diameter is 17·17

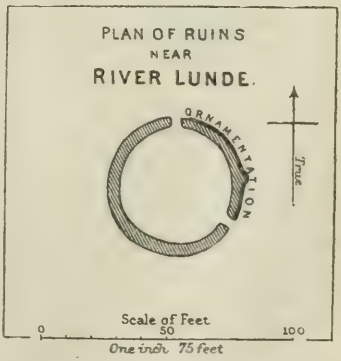


feet—that is, equal to 10 cubits of 20·62 inches; and this is also exactly the circumference of the little tower at its base, so that the diameter of the great tower divided by the ratio of circumference to diameter—3·14—gives the diameter of the little tower. This ratio of circumference to diameter and the above measure of 10 cubits seem together to have determined the length of either the radius or diameter (or halves of these) of all the circular curves of which the walls are composed. For instance, the radius of the curve of the part of outer wall behind the great tower is 169·3 feet, and this is exactly equal to the diameter of the great tower multiplied by the square of 3·14. The well-built, partly

circular, enclosure to the NW. of the tower has a diameter of 54 feet, and this is equal to the diameter of the great tower, 17·17, × 3·14. The curve of the outer wall from the eastern end of the sacred enclosure to A has its centre at the altar, and its radius is $107\frac{3}{4}$ feet. This is equal to twice the diameter of the great tower, 17·17, × 3·14. The curve of the wall from A to the doorway seems to have the same length of radius as the part of the wall behind the tower, namely $169\frac{1}{3}$ feet; but in our measurements there are hardly sufficient points fixed in the line of the curve to make quite sure of this. The inner long wall is parallel to the outer one until it reaches the sacred enclosure, so it may be considered as combined with the outer wall for our present purpose. Besides these there are no other well-built curved walls of any importance in the temple except the piece of wall near the monoliths, and it is too short to allow us to fix with certainty the position of the centre of its curve. It does not, however, seem to belie this system of measurement.

We can hardly expect to find this same system of measurement always applying to the buildings on the hill, for the form of these buildings is often controlled by the nature of the ground on which they are built. Still, it does apply in a manner; and the diameter of the curve of the wall at the eastern temple is $84\frac{1}{2}$ feet, which is equal to the semi-diameter of the great tower × $3·14^2$. Of the two curved walls on the left hand when entering this temple from the south the diameter of the curve of one is 54 feet, equal to 17·17 × 3·14; and of the other curve the radius is 17·17 feet. The only other regularly curved wall on the hill is the great wall with monoliths and towers, and the diameter of the circle of which its curve forms a part is 254 feet. This does not agree with our system of measurement, but this wall and its towers are not well built, and there is good reason to suppose that its outer face at least is not of the original period, but is a more recent reconstruction—in fact, we discovered the foundations of another parallel wall about 6 feet NW. of this, as is partly shown in the plan. If this were the original wall it would give a diameter of 266 feet for the circle, which equals the semi-diameter of the great tower × $3·14^3$.

At Matindela the only regularly curved piece of wall is that around the principal doorway; but it is so rough in its construction that one hesitates to deal with it, and we can only say that it seems to be a rebuilding on an old foundation which had a radius of $107\frac{3}{4}$ feet—that is, equal to twice the diameter of the great tower multiplied by 3·14.

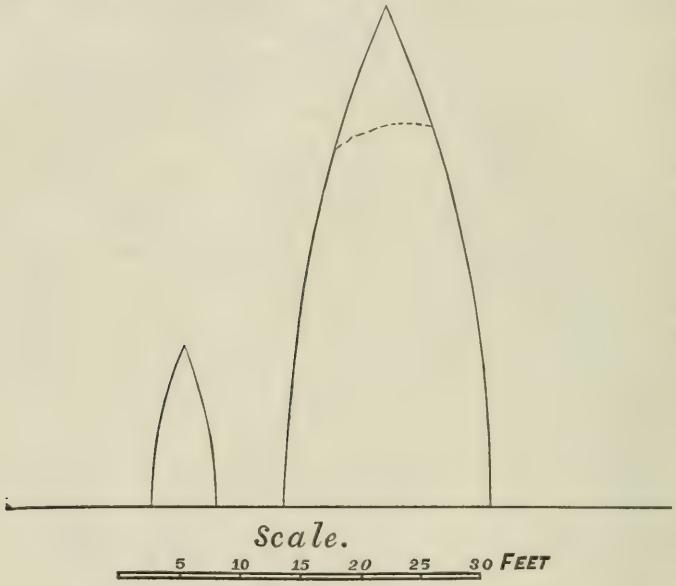


The little ruin at the Lunde river is circular in form and very well built, and its diameter is 54 feet, which is equal to the diameter of the great tower multiplied by 3·14.

The above-described twelve walls are the only regularly curved and well-built walls which we saw in

Mashonaland, so that every curved wall made by the original builders of Zimbabwe seems to have been constructed on this system.

To return to the towers, the same principle of measurement applies to the curves which determine their forms. If a curve with a radius equal to twice the circumference of the great tower (that is, $107\frac{3}{4}$ feet) be described with its centre on a level with the base of the tower, it will correspond exactly with the outline of the tower. The height of a tower bounded by such curves will be 42·3 feet, and this is equal to half the semi-diameter of the tower multiplied by the square of 3·14. The form of



THE TWO TOWERS.

[*The broken line shows the present top of the great Tower.*]

the little tower seems to have been determined in the same way by curves with a radius of 34·3 feet = twice its circumference. The height of this tower would be originally $13\frac{1}{2}$ feet, or half its semi-diameter $\times$ $3{\cdot}14^2$, so that the height of the little tower $\times$ 3·14 is equal to the height of the great tower.

The great tower is placed in the middle of the sacred enclosure, which is entered by a doorway at either end. These doorways are placed at the ends of the arc of $169\frac{1}{3}$ feet radius, and the ends of the arc are indirectly determined by the position of the sun when rising at the summer solstice. We are unable to adequately explain the reason for the position of the little tower, but its centre is 17·17 from the centre of the great tower, and about the same distance from the inner side of the great wall.

Solar worship was evidently practised at Zimbabwe, and we have evidence of this cult in the only remaining decorative features of the

temples, and in the little images of the solar disc which we found in considerable numbers.

Around the outside of the wall of the great temple, near its top, between the points marked A and B on plan, there extend two bands of a kind of chevron pattern. This pattern seems to have been symbolical of fertility, and it extends along the part of the wall which receives directly the rays of the sun when it is rising at the summer solstice. It reminds one of the Egyptian hieroglyphic symbol for water, and it also resembles the time-honoured symbol for the zodiacal sign of Aquarius. A worshipper of the sun would very naturally think of moisture being as essential to fertility as solar energy itself, for the heat and light of the sun are powerless to make plants grow when moisture is absent.

107¾ feet from A, and the same distance from K and B, is the centre of the arc A K; and at this point there is some ruined masonry, which seems once to have formed an altar. Zimbabwe is in 20° 16′ 30″ South latitude, and consequently the sun would rise there about East 25° South at the summer solstice were the horizon level. But Mount Varoma interposes itself between the temple and the rising sun at this time, so that the sun attains an altitude of 5° before its rays reach the temple. Then its amplitude will be more nearly 24°, and a line produced in this direction from the altar will pass across the doorway of the sacred enclosure, where the curve of the wall changes its radius, and, roughly, through the middle of the chevron pattern. Produced in an opposite direction for 73 feet, the same line would fall on a tall monolith which we there found lying by its well-built foundation. Where the pattern ends at A and B, the rays of the sun are nearly tangential to the curve of the wall; so that all parts of the wall, and those parts only, which receive the direct rays of the sun when rising at the summer solstice are decorated by this pattern. The sun's rays would not fall on the altar at this time, and it seems strange to have an altar devoted to solar worship under the shadow of a wall; but the same objection applies to every part of the interior of the temple, and we can hardly suppose that the priests performed their ceremonies of worship outside the temple as some tribes of Arabs do with some stone circles at the present day. The monolith 73 feet distant from the altar was sufficiently tall to receive the rays of the sun when it rose over Mount Varoma; and the shadow of a monolith erected on the wall at K would fall on it at the same time, and thus mark with great accuracy the occurrence of the solstice. Monoliths had been erected along the top of the decorated part of the wall, and may have served to mark the position of the rising sun at other periods of the year.

There are other instances of similar orientation to the sun on the horizon at the solstices. At the temple at the eastern end of the fortress on the hill there is a wall decorated with a dentelle pattern. We discovered the altar here, and a line drawn from it to the rising sun at the summer solstice will pass through the middle of this pattern. The great curved wall at the western end of the fortress, which is decorated with round towers and monoliths, has an aspect towards the setting sun at the winter solstice; and a line drawn

from the centre of the arc (where we may suppose the altar was) towards the setting sun at this solstice would pass through the middle of the row of towers and monoliths. At this western end of the fortress we have parts of two walls which faced the setting sun at the winter solstice decorated with dentelle pattern. As we have before remarked, Matindela is evidently a rather inaccurate reconstruction of an older temple, and the orientation of the patterns here is not so true as in the older temples. There are four oriented patterns in this temple; one faces the rising sun at the summer solstice, two the setting sun at this solstice, and one the setting sun at the winter solstice.

The motions of the stars were also observed at Zimbabwe, and we found three instances of means being provided for observing the culminations or meridian transits of stars from the centres of the arcs or from the altars. The stars so observed were invariably stars of the northern hemisphere, and those having a declination of between about 45° and 60°.

There is a curious and most prominent great stone poised on the summit of a cliff which rises perpendicularly for 50 feet, just behind the eastern temple in the fortress. This stone is true north of the altar, at the centre of the decorated arc in the great temple, and is 680 yards distant from it. The sides of the very narrow doorway in the 16 feet thick wall of the great temple have been made parallel to this line. The line of sight from the altar to the stone is inclined $8\frac{1}{2}°$, and the latitude of Zimbabwe is 20° 16′ 30″ South, so that stars having a north declination of 61° would, when crossing the meridian, appear to pass just over the stone, and the time of their meridian passage could be ascertained easily to within two minutes of time. Stars with a less declination, say as far south as 45°, could also have their meridian passages observed with considerable accuracy, and the line of the high doorway would help to direct the sight in the meridian line.

The altar in the eastern temple has been placed 10 feet from its proper place, at the centre of the arc, in order that stars might be observed crossing the meridian through a break in the wall of rock behind it, or perhaps in order that certain stars at that time might throw their rays on the altar.

True north of the centre of the curve on which the great wall with the towers and monoliths has been built, a great monolith stands on an eminence. This was probably used in conjunction with an altar at the centre of the arc to mark out the meridian, and enable the culminations of stars to be observed.

These observations of stars may have had a religious meaning, or they may have merely supplemented the solstitial observations in regulating the calendar.

It is hoped that the above-described mode of orientation of the temples, and the mathematical peculiarities involved in their construction, will yet provide a clue which will enable us to trace the builders of these interesting temples to their home. When it becomes possible to thoroughly explore the interior of Southern Arabia, similar ruins may be found there; or, when we have accurate plans of the elliptic temples at Marib and Sirwah, we may find that they embody the same peculiar system of measurements.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A., F.R.S.E.,

Assistant Librarian, R.S.G.S.

EUROPE.

The Weissensee in Carinthia.—Dr. Karl Grissinger has investigated the configuration and temperature of this lake, and published the results in *Petermann's Mitt.*, Heft 7, accompanied by a bathymetrical map and a diagram of temperatures at different depths. The White Lake is the most westerly of the lakes in the drainage area of the Drau, and lies 984 feet above the river and 3011 feet above the sea-level. Its length is $7\frac{1}{3}$ miles, its greatest breadth 984 yards, and its least 164 yards, where two piles of *débris* divide it into two unequal portions. Its area is a little more than $2\frac{1}{2}$ sq. miles. The greatest depth is 318 feet, but nearly half of the area has a depth not exceeding 65 feet. The mean is 110 feet. The mean slope is 9° 32′, which agrees with those ascertained by K. Peucker for other Alpine lakes. The temperature of the water in September was 67·5° F. at the surface, and decreased at an average rate of about ·27° per foot down to a depth of 99 feet. At this depth it was 39·9° F., and in the lower part of the lake this temperature was constant. The circumstance that the constant temperature is reached at such a small depth is explained by the sheltered situation of the lake. In winter the conditions are changed, for the surface is covered for four months by a sheet of ice 18 inches thick. Dr. Grissinger gives tables showing the propagation of solar heat through the water of the lake.

The Halligen of the North Sea.—*Petermann's Mitt.*, Bd. xxxviii. No. 8, calls attention to these little islands, which are threatened with annihilation. The information is derived from a paper in the *Forschungen zur deutschen Landes- und Volkskunde*, by Dr. Eugen Träger. At one time these islands must have been much larger, for in Hooge, which has an area of about 1480 acres, nearly ten acres are annually washed away. To systematically enclose the islets with dykes would not pay, but some measures might be taken to lessen the destruction. They are worth preserving, because they act as breakwaters, and thus protect the alluvial lands of the mainland. They might also furnish a basis for future reclamation works. The Hamburger Hallig has already been connected with the mainland, and Dr. Träger advises that banks should be run out to Oland and Habel as soon as possible.

ASIA.

Issyk-kul.—At a meeting of the Paris Geogr. Soc., on July 1st, M. E. Müller read a note extracted from a Russian journal on ruins existing below the waters of this lake. Both the Russian and nomad populations of the neighbourhood have a firm belief in the existence of these buildings, and with some reason, for at different times human bones, fragments of baked bricks, coins, objects of copper, etc., have been fished up from the water. Moreover, Chinese annals mention a town of the Ussuns, Tchigu or Tchigutchin, on the shores of the lake, and a Catalan map of 1374 represents a Nestorian monastery as standing at the northern side. At two places, Turaïghyr and Koïssar, various objects are still picked up, either in the water or on the margin, for the lake is gradually contracting. At the former place it is said that, when the water is quite quiet, walls 3 feet high can be seen of red brick, and that the directions of streets may be traced. Blue bricks, also, have been found in sufficient quantities to pave the floor of the post

station, and skulls and copper utensils have been drawn up from the bottom of the lake. At Koïssar, which stands at the mouth of the river Kara-kol, bones, fragments of rough earthen vessels, and *débris* of bricks have been found along the bank for a distance of nearly a mile. It may be that the destruction of these towns or hamlets was caused by earthquakes, for it is known that the banks have at several places been suddenly submerged by subterranean convulsions. An event of this nature took place as recently as June 29th, 1889. The town of Tchigutchin is indicated on Hyacinthe's map at a point very near to the submerged ruins at Koïssar. Some have affirmed that it was inhabited by Ussuns, and that this people were the ancestors of the Kirghiz. They are, however, described as having blue eyes and russet beards, and, therefore, exhibiting little resemblance to the Kirghiz. They must also have attained to a higher standard of civilisation than the latter, seeing that they made bricks and worked in copper. The hedging-bills that have been found show that they had also some knowledge of agriculture. Hyacinthe connects the Ussuns with the Kalmucks, who, though nomads, were superior in culture to the Kirghiz.—*Compte Rendu*, Nos. 12, 13, and 14.

Ferghana.—*Petermann's Mitt.*, Bd. 38, No. 7, gives some interesting details extracted from the Russian *Invalid*. The area of the country is there stated to be 39,500 square miles, the Transalaï being taken as the southern boundary, except where the Kara-kul region joins on. Now, the Russians, claiming the Pamir as a former appendage to the Khanate of Kokand, have laid down the boundary of the Government of Turkistan along the Hindu Kush. Only 4835 square miles of the land of the district, lying in the valley of the Syr-Daria, are cultivated. The rest is steppe or mountain land, for the most part treeless and desolate, and in many places useless even for grazing. Beyond the Alaï range, the southern boundary of the Syr-Daria basin, flows the Kizil-su to join the Amu-Daria. Of this elevated valley, running between the Alaï and the Transalaï, the reports in the *Invalid* contain some detailed information. From the saddle Taun-murun in the east to Darautkurgan on the frontier of Bokhara, a distance of 86 miles, the valley sinks from a height of 10,800 feet to 8500 feet. The immense snow-fields of the Transalaï, the summits of which rise more than 21,000 feet above the sea-level, pour down an abundant supply of water and promote the growth of grass in the valley. Hither the Kirghiz of Southern Ferghana come in such numbers to feed their herds during the short summer, that last year Baron Vreffsky, the Governor, met with 10,000 *kibitkas*. As early as September they are driven away by the nocturnal frosts, and the small permanent population withdraws down the valley to its winter quarters. The Alaï valley and its slopes, in common with the Pamir lands, is destitute of trees, owing to the long winter of eight months and the drying winds. The climate in Ferghana passes through all the stages from tropical heat in the valley of the Syr-Daria to arctic cold on the heights of the Transalaï. Scarcity of rain and east wind prevail everywhere. The yearly mean temperature in the valley is 63° F. In February there is usually no frost. In March the average temperature is 77° F.; from May to September 111° to 113°, with only a slight fall during the night. For several years no snow has fallen, though winter cold of −4° has been recorded. The cultivated soil in the Syr valley is of löss, which necessitates artificial irrigation. Where this is available, agriculture flourishes, and justifies the ancient fame of this fruitful country. Wheat, rice, barley, vines, cotton, etc. are grown: vegetables cover nearly 27,000 acres, and all the best fruits of Southern Europe thrive here. In 1889 dried fruits to the value of about £19,500 were exported, in spite of defective plant. The cultivation of cotton is of great importance

for the future of the country. Since the Russian occupation American cotton has been planted with great success, and in 1889 this crop yielded a net profit of about £172,000. The production of silk, to which the ancient population owed its prosperity, has fallen off latterly, and the Russians are trying to revive it by the establishment of experimental stations and schools. Forests are rare, the area covered by them being less than 1600 square miles. They would be very beneficial to the productive powers of this dry country, and therefore the Russians are endeavouring to extend the area covered by vegetation.

Ferghana is rich in minerals : extensive deposits occur of lead, coal, graphite, and naphtha. Hitherto, however, naphtha only has been extracted, enterprising men with capital being scarce. Cotton and silk materials are manufactured, and wool, leather, paper, knives, and saddles are also exported. The value of these exports in 1889 was about £930,000.

The population numbered 785,600 in 1889. By far the larger part are Mohammedans. Russian settlers immigrate in yearly increasing numbers, and for the most part establish themselves in the neighbourhood of Marghelan, the chief military centre. The most numerous are the Sarts, and then follow the Tajiks and Karakirghiz, the latter living chiefly in the mountains. The most populous towns are Kokand, with 53,000 inhabitants, Andijan, with 31,000, and Marghelan, with 26,000.

Road construction has made little progress under the Russians ; there are now in existence 265 miles of post roads. The chief highway runs from Kkojent, on the great route from Samarkand to Tashkent, to Kokand, whence carriage roads branch off to the more important centres of population. The valley of the Kizil-su is approached by steep bridle paths over the passes of Taldyk and Tenghis-bai. Communication with Kashgar is of great importance, both military and commercial, though the ancient route into the Tarim basin is little frequented, for, in spite of the efforts of the Russians, the trade of Kashgar, Yarkand, and Khotan passes principally to Kashmir over the Karakorum mountains. A project for a road over the Terek-davan has been abandoned, because there was no prospect of its being continued beyond the frontier.

The Trans-Siberian Railway.—The construction has been ordered of the section of this railway between Tcheliabinsk and Omsk. It is to be commenced during the present year. The length of this section, which passes through Kurgan and Petropaulovsk, is 316 miles in length. Next year the section from Omsk to the river Tom will probably be constructed. The length of line already opened, or under construction, is now 597 miles, if Zlatoust be taken as the point of departure, and nearly 265 miles are in course of construction at the other extremity, from Vladivostok to Grafskaia. Next year work will be commenced on a new stretch of about 500 miles. At the same time the completed sections will be opened to traffic. These form only about a fourth of the total length from Zlatoust to Vladivostok ; about 2980 miles will still remain to be constructed.—*Le Mouvement Géogr.*, No. 14.

AFRICA.

The Expedition of the late Captain Stairs.—The *Mouvement Géogr.*, July 31st and Aug. 14th, publishes some geographical data contained in letters from Captain Stairs. Of Lake Tanganyika he says that its altitude, as shown by three dozen observations made with the aneroid and boiling-point thermometer, is 2693 feet above the sea-level. The lake continues to fall, and whereas when Cambier was at Karema the water bathed the rocks at the foot of the station, it has now

retired to a distance of 2686 feet, having fallen a vertical height of 19 feet. The natives say that it takes 15 years to fall and as long to rise, and that in two years more it will have reached its lowest level. From Captain Joubert's station the expedition ascended to the village of Mandu, $3\frac{3}{4}$ miles from the lake, and 3736 feet above the sea-level. Here they were on the crest of the ridge which skirts the western shore of the lake, and attains its highest elevation in this part in Mount Rumbi (5000 feet). The form of this mountain is most peculiar: precipitous rocks of a reddish tint are crowned by a flat summit entirely bare of vegetation, which is distinguishable at a long distance. In the mountains of Makololo, which rise as high as 6000 feet, the soil is rich in iron. The village of Kaomba is celebrated for its founderies. Enormous quantities of the metal exist in almost a pure state, from which the natives make hoes, hatchets, lances, etc. By the lake, to the south of Mt. Rumbi, copper is extracted, and Captain Joubert bought an ingot of this metal from the natives and a few specimens of a stone resembling malachite. A few days after quitting Rumbi Captain Stairs reached the Lufuko, a river 25 yards broad and two feet deep, which enters the lake at Mpala. In its valley grow forests of excellent building wood, which might be floated down the river to the lake. The country here is totally different from that on the eastern side of the lake. Instead of arid and sandy plains the surface is undulating, covered with green trees and plants, and watered by numerous streams of fresh water which, according to the natives, do not fail in the dry season. Between the Lufuko and the Eastern Lualaba (Luapala) there is splendid pasturage for cattle and sheep. The valleys are invariably fertile, and the slopes of the mountains are adapted for the cultivation of rice and other food-stuffs consumed by the natives. The great elevation of this region is a guarantee that Europeans could preserve their health here. At the present time the valley of the Lufuko is uninhabited, for the whole district has been devastated by a certain Makatubu, the factotum of an Arab in Zanzibar. Separated from the Lufuko by a small range of mountains lies the Lufidwa, a rapid river 18 yards broad, which flows into the Lufunzo, a tributary of the Luapula. The country abounds in elephants, and the Wanyamwesi still find the chase profitable for the sake of the ivory. Descending the Lufidwa, the expedition crossed the Lufunzo a little above its junction with the Eastern Lualaba, and camped at Gwena on the last-mentioned river, in 8° 9′ 44″ S. lat. and 29° 6′ 45″ E. long., at an altitude of 2960 feet. At first sight the Luapula appears to be a broad, deep, and powerful stream, but on closer examination one finds that, though deep at some spots, it is encumbered with jagged rocks submerged only a foot or two below the surface, and consequently can be navigated only in small boats and canoes. According to information given by certain Arabs, it flows for a distance of seven long days' march over a rocky bed, where rapids succeed one another almost continuously and large cataracts occur in two places. The mean breadth of the river is about 300 yards, but occasionally it expands to nearly double that width. In the rainy season it never rises more than thirty inches above its lowest level. Fifteen days' journey to the north-north-west of Gwena the Eastern Lualaba joins the Lualaba of Msiri, or Kamolondo, and five days' journey below the confluence the Lukuga, coming from Lake Tanganyika, enters the united stream. After it leaves Lake Moero the Luapala is known only as the Lualaba or Luvwa, and Captain Stairs suggests that it should be distinguished on maps by the latter name. On the west of this river runs a chain of mountains with steep peaks covered with trees, and rising to 2000 feet above the stream. Passing the Luvule, which flows into the Luvwa, Captain Stairs crossed the watershed, about 4000 feet high, and descended into the valley of the Luvua, a tributary of the Lufira. Magnificent stretches of land

border this river, and game is plentiful. To the south-west the country changes its character, and in many places water is scarce in the dry season. To the west of the Luvua the chain of Konde Rungu rises in some points to as much as 3000 feet above the plains of the Lufira, extending southwards to 11° 20′ S. lat., where the mountains turn towards the west. The soil of the Lufira plains appears to be of fine quality : game is plentiful, and the grass is good. Where the expedition crossed, the river was 80 yards broad, with a depth of 40 feet and a current of nearly one mile per hour. It has cut out a channel 40 feet deep, enclosed by banks of red clay. The Lukurewe is nearly 30 yards broad, and has a current of one and a half miles per hour. At a distance of about 6 miles above the crossing-point the river falls over a wall of rock. The cascade must be of considerable size, for the column of vapour it emits rises at least 70 feet above the plain. The mean altitude of the Lufira in this region is 3139 feet.

A table of altitudes, latitudes, and longitudes accompanies Captain Stairs' letters.

Rainfall at the Cape of Good Hope.—Dr. K. Dove remarks in *Petermann's Mitt.*, Bd. xxxviii. No. 7, that hitherto the climate of Cape Town has been frequently considered typical of the well-watered parts of the region of winter rains in the Colony. As far as temperature is concerned, the assumption may be legitimate, but recent observations show that, as regards rainfall, the immediate neighbourhood of Cape Town occupies a peculiar position. From the table of rainfall which he has compiled Dr. Dove points out that the most abundant rainfall does not occur, as would be expected, on the northern slopes of Table Mountain, which are directly exposed to the rainy wind of these latitudes, the north-west. Nor is this deficiency due to any adverse influence of the heights to the north-west, for records of observations at Green Point and Signal Hill, the latter nearly 1150 feet high, show the lowest mean fall on the Cape peninsula, while at Kloof Street, on the south-eastern slope of these elevations, the amount of rain is considerably greater than at Cape Town, where the mean for five years is only 28 in. The whole of the valley sheltered from the north-west wind receives large quantities of rain, and the greatest rainfalls measured in South Africa occur on the southern slopes of Table Mountain. An explanation of this fact is hard to find. Dr. Dove supposes that the heavy rains that fall in the valleys on the south and south-west of the mountain during the winter half of the year are due to the south winds, which frequently blow at this season. It is well known that the temperature in False Bay, which has an area of more than 230 square miles, and in the adjacent waters, is several degrees higher than in Table Bay, causing Simon's Town to be warmer than Cape Town. Possibly, then, the southern winds of winter acquire a higher degree of temperature and greater humidity in passing over False Bay, and for a short course fulfil the functions of an Equatorial rain wind.

The rainfall of 1888 was most interesting, in not only revealing the possible variations in the quantities of rain, but also as proving that the limits of climatic regions are of fundamental importance with regard to the occurrence of certain rare meteorological phenomena, and are intimately connected with abnormalities that periodically recur. The winter half of the year 1888 was marked by excessive rainfall in that part of the Colony which is contained within the limits of the subtropical region. Commencing somewhat to the east of Cape Agulhas, the boundary of this region runs past Worcester northwards to the south-western corner of the Roggeveld Mountains ; it then follows this range, passes close to Calvinia, and holds a north-westerly course to the Orange river. Now, in 1888, certain districts to the west of this line received most unusual quantities of rain, and

also on the western part of the south coast of the Cape region, which from its fairly abundant winter rains assumes the character of a small transitional area, the excess above the annual mean was very marked. In the *Meteorologische Zeitschrift* of 1885 it was stated that drought seldom prevails over the whole territory of the Colony in the same year, but that a dry season in the interior often coincides with heavy rain on the south-west coast, and this was the case to a most remarkable degree in the year 1888. Dr. Dove gives the rainfall of that year at different stations in percentages of the mean for several years. The greatest percentages in rainy years always occur where the mean is small. But even in the arid inland districts a rainfall of more than 150 per cent. is seldom recorded, while in the better-watered parts of the Cape an excess of 25 per cent. is indicative of an extremely wet season. During the 47 years that rain has been measured at Cape Town a fall of 125 per cent. of the mean has been reached only eight times, and the fall of 1888, 140 per cent., has been only once exceeded, namely, in 1878, when 160 per cent. was recorded. Dr. Dove's table shows that the abnormal conditions of the year 1888 were confined to the subtropical region defined above. Of particular interest is the distribution of the rainfall over the individual months, for it shows how the causes of this exceptional phenomenon could alone be effective in this climatic province, for the period from May to August was marked by abundant rainfall, while in the other months the mean was but slightly exceeded. Indeed, in the western districts May and June were the only months in which extraordinary quantities fell, these quantities being such as had never been observed before. Nevertheless the number of rainy days was not greatly increased, so that the intensity of the rainfall must have been enormous.

The Hurricane in Mauritius.—From the account given by Dr. C. Meldrum, Director of the Royal Alfred Observatory, it appears that the hurricane which devastated the island on April 29th was in many respects unique. Never before has a great hurricane visited the island between April 15th and December 1st, nor has one commenced with a north-east wind, the south-east being the direction from which they have invariably come. Consequently, at 11 o'clock on the very day of the disaster, as the wind was then blowing from north-east by east, and the barometer was at 29·338 inches, it was expected that the velocity of the wind would not exceed 56 miles per hour. On February 12th, with the barometer at 29·325 inches, a north-easterly wind only attained a velocity of 47·5 miles. On April 29th, however, the barometer continued to fall with great rapidity, reaching its lowest reading, 27·961 inches, at 2.30 p.m. The maximum pressure of the wind for five minutes was 73 lbs., corresponding to a velocity of 121 miles per hour. Soon after 11 o'clock the telegraph wires were broken, and all communication ceased. The barometer continuing to fall, and the wind being nearly constant, it was inferred that the centre of the depression would probably pass over the island, and that then the wind would blow from nearly the opposite direction. The centre actually passed over a point about 8 miles to the west of the Observatory, and apparently travelled across the island in an east-south-easterly direction. There are only two ways in which the passage of the centre from WNW. to ESE. may be accounted for. The cyclone, which had been travelling to the north and north-west of the island on a south-westerly course, may have veered southwards and borne down on Mauritius; or, secondly, a small secondary cyclone, generated in the south-east quadrant of a larger one, may have travelled to the south-east. The latter hypothesis is the more probable, for the small but violent hurricane exhibited all the characteristics of a local disturbance.

There was a great deal of thunder and lightning on the night of the 27th and

the morning of the 28th, and also frequent lightning on the night of the 28th, but hurricanes in Mauritius have seldom, if ever, been immediately preceded by those phenomena. It should be noticed that from April 25th to 29th there were five to six groups of sunspots, indicating a considerable increase of solar activity, and that from the 25th to 28th large magnetic disturbances occurred.—*Quarterly Journal of the R. Meteor. Soc.*, July.

AMERICA.

The Magdalene Islands.—This group is situated nearly in the centre of the Gulf of St. Lawrence, and extends for a distance of 57 miles in a direction from north-east to south-west, its greatest breadth being about 14 miles. Its most southern point lies about 50 miles from Prince Edward Island, and its northern about 60 from Cape Anguille in Newfoundland. The islands are right in the track of the trade of the Gulf and River St. Lawrence, and even vessels entering by the Straits of Belle Isle have been driven upon them. In the distance they have the appearance of rounded hills, but on a closer approach steep cliffs of red, grey, or brown freestone, rising two to three hundred feet or more into the air, give variety and grandeur to their forms. The names of the islands are Amherst, Grindstone, Alright, Coffin, Old Harry Head, North-East Cape, North Cape, Grosse, and Wolf. Amherst, the most southern, is also the largest. All the islands from Amherst to Grosse Isle were formerly spoken of as one, under the name of Magdalene Island, being, with the exception of Alright, connected by marsh or sand-beach. The area of the islands is about 100,000 acres, and they are inhabited by about 5000 persons, the greater part of whom are of French origin. Fishing is their chief occupation. Some few crops are raised; but, though the soil is of excellent quality, there is scarcely any proper farming. The domestic animals are of very poor breeds. The climate is cooler in summer, and milder and more variable in winter, than that of northern counties of New Brunswick or of the northern parts of Newfoundland, which lie in the same latitude. In winter all the harbours and bays are frozen over, and the inhabitants can ride on their hardy ponies from one island to another. For nearly five months there is no communication with the outer world except by telegraph.—*Proc. and Trans. of the Nova Scotian Institute of Science*, 2nd Series, vol. i. part 1.

The Intercontinental Railway of America.—A Commission met at Washington on December 4th last year, to which the many of the republics of Central and South America sent delegates. The most interesting report presented by a sub-committee was that dealing with the direction to be followed by the survey parties. The proposed line is to start from the southern frontier of Mexico, the railways of that country being already provided for. Through Central America the Pacific coast is recommended as the most suitable route, for here are the most thickly-inhabited districts, the physical obstacles to construction are least formidable, and short lines exist which might be utilised. From Ayutala, then, the line would follow the Pacific coast to Santa Lucia, where it would meet the Central Guatemalan Railway running to Exuintla, and pass through Santa Ana into San Salvador. Here the New Central Railway, passing through the towns of San Salvador, San Vicente, and San Miguel, affords means of communication with Guascoran on the Honduras frontier. The committee propose that the line should then skirt the Gulf of Fonseca, pass through Choluteca to Chinandegua in Nicaragua, where it could join the railway from Corinto to Lake Managua, and, passing along the lake, take up a short line already constructed to Massaya. On entering Costa Rica the route leaves the Pacific coast and crosses the plains to Alajuela, whence a line now

runs to Puerto Limon. Finally, by a course not yet definitely laid down, the railway would cross the Isthmus of Panama and enter Colombia by the valley of the Atrato.

In South America not only has a route to be chosen that, passing through large centres of population, will be satisfactory from a financial standpoint, but the more remote republics, such as Venezuela, must be connected with the main line. The strip of coastland on the western side of the Andes presents the greatest facilities for construction ; but, as far as it extends through Colombia and Ecuador, is almost uninhabited, and consists of arid lands incapable of yielding commercial roducts, while from Peru and Chile the inland regions could only be reached by branch lines crossing the Andes. Again, on the western side of the cordilleras large rivers have to be crossed, and remunerative traffic is not to be expected owing to the smallness of the population. There remains then the route along the central highlands, where are situated the principal towns of Colombia and Ecuador, and which in Peru and Chile are already connected by short local railways with the Pacific coast. The sub-committee therefore planned the line to run from the valley of the Atrato across the western spur of the Andes to Antioquia, where a branch will be carried to Cabello in Venezuela. Beyond Popayan the Andes have to be crossed for the second time, and here will be the chief difficulty to be overcome in Colombia. In Ecuador the towns of Ibarra, Quito, Cuenca, and Loja will be connected. In Peru the line will strike the valley of the Alto Marañon and follow it to Cerro de Pasco, then, passing through Cuzco, Santa Rosa, Puno, and along the shores of Lake Titicaca to La Paz in Bolivia, it will reach Oruro and Huanchaca. Here it will divide into branches in order to connect Chile, the Argentine Republic, Uruguay, Paraguay, and Brazil. A line to Antofagasta is already in existence. The Argentine Republic has a railway terminating at Jujuy, to which town a line must be made from Huanchaca, while another will form a junction at Asuncion with the railways of Paraguay and Uruguay. The most costly branch will be one from Huanchaca to Rio de Janeiro, which, it is proposed, shall cross the river Paraguay at Corumba, and follow the river Taquary to Coxim, from which point it will be continued by lines already constructed or projected. Whether this gigantic scheme will ever be carried out is very doubtful. The impoverished republics of South America are unable to furnish the capital, and there is a fear that, in return for a guarantee, the United States may demand from these republics commercial advantages that they may be unable to grant.—*The South American Journal*, August 6.

The Chile and Argentine Railway.—An account of this line, which was noticed on p. 497 of vol. vi., is given in the *South American Journal* for August 6th. It connects Mendoza and Santa Rosa dos Andes, and extends a distance of 109 miles into Argentine territory, and 40 miles into Chilian. The town of Mendoza is 650 miles from Buenos Ayres, and the Chilian extremity of the line is 81 miles from Valparaiso. The total distance between the oceans is, therefore, 880 miles. The line is already open as far as Uspallata, and before the end of the year will probably be open to Punta de las Vacas, 88 miles from Mendoza. On the Chilian side the line is nearly completed to Rio Blanco, a distance of 20 miles, and when these sections are open to traffic a traveller will be able to make the journey from Buenos Ayres to Valparaiso in 72 hours, driving the 41 miles between the termini of the railways. As the lines are further extended, and when the train service from Buenos Ayres is accelerated, the time of transit will be considerably shortened, and the cost will be only about a third of that for the sea voyage. The gauge of the State railways is 5 ft. 6 ins. ; but for the Transandine, which runs almost entirely through mountainous country, the mètre gauge has been adopted. On the first 22

miles from Santa Rosa the gradients will nowhere exceed 2½ per cent., and ordinary locomotives will be used, but from this point to the summit a rack rail must be laid down. From Juncal to the Las Cuevas valley on the Argentine side the tunnels will be almost continuous. Their total length will amount to about 14,230 yards, the longest, under the summit of the pass, being 5470 yards long. This tunnel lies at an elevation of 10,465 feet above the sea-level, and at 8054 above the termini of the railway, Mendoza and Santa Rosa.

The Cayman Islands.—In *Goldthwaite's Geographical Magazine*, July, Mr. Allan Eric has a note on these seldom-visited islands. The group consists of Grand Cayman, Little Cayman, and Cayman Brac. The first, and largest, lies 178 miles west-north-west of Negril Point in Jamaica, and is seventeen miles long, with a breadth of seven miles at the west end, and four at the east. There are bold rocks on the coast, but no elevation in the group rises higher than 150 feet. Many fine and deep harbours are enclosed by the coral reefs that skirt the eastern and part of the northern shore of Grand Cayman, but their entrances are too small to admit any vessel larger than a lugger. The islands are well wooded, logwood, fustic, mahogany, and cedar being the most common trees, and the birds are numerous and of many different species. Horses and cattle are reared on the abundant pasturage in sufficient numbers to meet the wants of the inhabitants, and fish of many kinds swarm around the coasts. Near Bodden Town, Grand Cayman, is a remarkable pit, sixty feet deep, leading by a narrow opening into a stalactitic cave of many vast chambers. But, perhaps, a more wonderful curiosity is a natural cistern at the east-end of the island filled with clear spring water. It is seventy feet long, by fifty wide, and forty deep, and lies in the middle of a cliff of solid flint rock. On the approach of a storm the water is said to assume a turbid, milky appearance, and to emit an offensive odour. Grand Cayman is inhabited by a population of about 4000—coloured and white—who fish for turtle along the banks and cays of the Central American coast, and trade with the islands about Honduras. They also carry turtle, coco-nuts, and logwood to Jamaica, and derive a considerable income from the phosphate rock which abounds in some localities. Little Cayman contains only thirty-five or forty people, and Cayman Brac has about three or four hundred white, and one hundred coloured, inhabitants. This island abounds in sea birds, and their eggs are collected and conveyed to Jamaica.

GENERAL.

Displacements of the Earth's Axis.—On June 2nd Professor F. Küstner read a paper before the Hamburg Geographical Society on these movements. The earth's axis of revolution may change its position in space, or with respect to the globe itself. The first movement has been known since ancient times, and is due to the attraction of the sun on the equatorial regions. Were the earth a perfect sphere, this attraction could have no effect on the direction of the axis, but, as it is, the excess of matter near the equator is drawn down towards the plane of the ecliptic, and the angle between the planes of the equator and ecliptic is diminished. Were the sun the only body controlling the earth's movements, the axis would in course of time assume a position perpendicular to the plane of the ecliptic, which it would ever retain ; but, owing to the influence of the other heavenly bodies, it describes a path around the pole of the ecliptic in about 26,000 years. This movement causes no change in the latitude and longitude of any place on the earth's surface, but is indicated only by variations in the apparent positions of the stars. Any change of direction of the axis within the earth itself will, of course, change the position of the whole network of meridians and parallels. As long as

the axis of rotation coincides with the axis of figure no disturbance is produced. The formation of vapour, rainfall, alters the atmospheric pressure, and ocean currents may also cause a displacement of the principal axis of inertia, and thereby produce a revolution of the position of the axis of rotation. Bessel was the first to institute inquiries into this phenomenon, and he was followed by Peters of the Pulkowa observatory, but the observations of both astronomers led to nothing. An alteration in latitude was first discovered in Berlin by the lecturer in 1881 and 1882. These observations were continued in 1884, when it was found that the altitude of the Pole increased by ·3″ between spring and summer, and then diminished until the spring of 1885, the amount being ·5″. In 1881 the altitude of the Pole was likewise ·2″ greater than in the following spring. The angles are determined by the inclination of a plumb-line to the plane of the equator. Of late years other observations have been made, the most important being those in Honolulu (vol. viii. p. 103). Dr. Küstner looks to meteorological phenomena as the causes of these changes, the variations in both cases having a period of twelve months. To deduce theoretically the motion of the Pole is impossible, for it depends in part on the elasticity of the Earth, by which its form is able to partially adapt itself to any change due to a disturbance of the principal axis of inertia. On the other hand, it is of great importance for geodesy that these movements should be determined by observation, and it is not impossible that some conclusions may hence be arrived at regarding the condition of the interior of the globe.—*Deutsche Rundschau*, Heft 11.

Oceanography.—One of the most important of the late meetings of the British Association was one in which the chemical and geographical sections combined, under the presidency of Mr. J. Y. Buchanan, for the discussion of certain questions of chemical oceanography. Mr. Buchanan communicated some new observations on the density of water in the deep sea off the coast of Brazil, which showed that the depressions in that region are filled with water formed by the melting of ice in the Antarctic Ocean. Dr. Buchan pointed out the bearing of this phenomenon on meteorological conditions. Another paper, dealing with the hydrography of the Baltic, was read by Professor Petersen. The author's exposition of the general circulation of the water and the distribution of density was based on most carefully executed observations, and was illustrated by means of large maps. In summer a strong current of brackish water flows out through the Skagerrack and sweeps northwards round the coast of Norway. In winter, when the rivers are frozen up, this current is replaced by a stream of comparatively warm and salt water from the North Atlantic. As long as it prevails the herring fishery can be carried on. Arrangements have been made with several Swedish and Danish steamers to collect samples of water in the North Sea, in order to determine the exact origin of this remarkable current. Dr. Andrussoff read a paper on the Russian Black Sea expeditions, which have already been noticed in this *Magazine*, and Dr. Gibson expounded certain chemical differences by which water from different regions can be distinguished. Dr. Gibson's results were corroborated by Mr. H. N. Dickson from his own observations in the English Channel.

The Gypsies.—At a meeting of the Geographical Society of Geneva, on April 8th, a communication on the Gypsies from Professor Cora was read (*Le Globe*, No. 2, 1892). The author admitted their Hindu origin, and stated that they arrived in Europe by two routes, some skirting the north coast of Africa and crossing into Spain by the Straits of Gibraltar, while others, having reached the Balkan peninsula, spread westwards and northwards. These migrations seem to have taken place between 1400 and 1500. The number of this race at the present day has been variously

estimated at from 300,000 to five million. M. Cora affirms that there are in Europe at least 800,000 Gypsies, of whom 250,000 dwell in Rumania, 150,000 in Hungary, 135,000 in Turkey, 80,000 in Russia, and 40,000 in Spain. In Asia Minor there are about 70,000, and perhaps 20,000 in Persia. In Africa they are to be found in small numbers in many parts—in the north and in the Sudan. In America they are chiefly met with in Brazil, and even in Oceania they have their representatives. The number of Gypsies in all parts of the world M. Cora estimates at two millions. They are essentially nomads, even to a greater degree than the Arab. They have no ideas of a deity or of a future life ; indeed, they feel no need of a religion, but readily attach themselves outwardly to any sect with a view to temporal advantage. In intellect they are still children, and their primitive barbarism is never really eradicated. In music only have they arrived at acknowledged proficiency. M. Cora considers that the Bohemian dances are much overrated, and that the celebrated dancing-girls of Moscow do not deserve their reputation. Gypsies have a surprising knowledge of routes and roads, and possess a code of signs which, marked on trees and walls, indicate the way to those of their race which come after them. Their domestic life is unfettered by civil and religious laws. Marriage is a free union, though the tie is seldom dissolved. The Gypsies have preserved their liberty and independence, but they cannot be said to be happy, if there is any meaning in their saying, "I am not accustomed to live like a Christian ; I live like a wild dog."

MISCELLANEOUS.

The British steamer *Kenia* ascended the **Juba** in July last for a distance of 68 miles.

M. de Mizon started on August 10th for another expedition up the Niger and Benue to Adamawa, with the view of establishing commercial relations with the neighbouring peoples.

The twenty-third volume of the proceedings of the **Royal Colonial Institute**, recently issued, contains several interesting papers. *The Malay Peninsula ; Its Resources and Prospects*, by W. E. Maxwell, C.M.G., and *Ceylon ; Its Attractions to Visitors and Settlers*, by John Ferguson, deserve special mention.

The *Pola*, of the Austrian navy, set out from the Adriatic last month for a cruise in the eastern basin of the **Mediterranean**. As in 1890, the vessel is commanded by Captain Mörth. Professor Luksch of Fiume, and Dr. Steindachner, Director of the Geological Museum in Vienna, will superintend the scientific work. The cruise will last about fifty days.—*Nouvelles Géogr.*, August 4th.

A special commission has lately been engaged in the examination of a project for the construction of a **bridge over the Bosporus**, from Constantinople to Scutari. The distance to be spanned is nearly 2190 yards. Were the plan carried out, and the railway prolonged from Haïdar Pasha to Scutari, through communication would be established between Asia Minor, Budapest, Vienna, and Paris.—*Bull. de la Soc. R. Belge de Géogr.*, No. 3.

Four steamers of the Dundee whaling fleet left the Tay last month for the **Antarctic Regions**. Although the main object of the vessels is to seek out fresh whaling grounds, some practical scientific results from this pioneer cruise of six months' duration are confidently expected. Instruments and instructions as to observations have been supplied by the Royal Geographical Society, and the Meteorological Office, of London.

M. Gaston Buchet, charged with a scientific mission in **Iceland** by the French Minister of Public Instruction, has placed his services at the disposal of the Paris Geographical Society for the purpose of making investigations on questions connected with geography. His chief sphere of work will be the great peninsula on the north-west, which juts out towards Greenland. M. Buchet set out early in June, and is expected back in October.—*Compte Rendu*, Nos. 12, 13, and 14.

From the Imperial Commissioner's report it appears that the population of **The Marshall Islands** consists of about 15,000 natives and 118 strangers. The majority of the latter are settled on the lagoon of Yaluit on the island of Yabvor (Bonham Island ?). *Pandanus*, breadfruit, arrowroot, and coco-palms are the only forms of vegetation the thin layer of soil which covers the coral substratum will support. The cultivation of coco-palms might be greatly extended, but the natives are lazy and wages high. *Copra* is the only article of export. The grass of the islands is not sufficiently nutritious for cattle and sheep, and experiments with imported seeds have not been successful. Cattle for consumption have therefore to be imported. In 1891 the three firms established on the islands exported goods to the value of £30,198, and the imports amounted to £32,750. The trade is principally with Germany.—*Globus*, Bd. lxii., No. 5.

NEW BOOKS.

The Land-Systems of British India, being a Manual of the Land-Tenures and of the Systems of Land-Revenue Administration prevalent in the Several Provinces. By B. H. Baden-Powell, C.I.E., F.R.S.E., M.R.A.S. 3 vols. Oxford: At the Clarendon Press, 1892. *Price* £3, 3*s*.

As Mr. Baden-Powell truly remarks, the systems of land-revenue administration in India are of so much importance that every one who aims at understanding the administration generally must understand this first. For every class of public officers in India, for the economist who interests himself in the welfare of that country, and for the politician who advocates changes in its administration, the comprehension of the broad features of land-revenue administration is of the first necessity. The official charges and sub-divisions which it demands are the basis of the entire administrative system, and there is no other department of the public service which is not in some way or another brought into connection with the land-revenue officials, and does not require for the proper discharge of its special duties some acquaintance with the land-tenures. The need for a manual containing a clear and intelligible exposition of the various systems is therefore apparent. But the task of preparing such a manual was one of no common difficulty. Had India been a small country, with a homogeneous or thoroughly-amalgamated population and a common history, or had its various parts ever in the past been welded together so as to form a united whole, governed on one system and pervaded by a recognised common law, it would have been comparatively easy. But the case with India is very different, and as the result of different historical development the various provinces now present systems of seeming incongruity and perplexing intricacy. To determine and elucidate the common underlying principles of universal application, to distinguish the factors which had produced modifications and affected development, to describe accurately and render intelligible the peculiarities of system in each province, constituted a task that demanded laborious research, intimate acquaintance with concrete examples of the

leading types, a keen insight into the influences which had worked to produce diversity, and a thoroughly scientific method of investigation and reasoning. Only thus was it possible to show not only what the facts now are in the various sections of the great Empire, but to make them intelligible by tracing how and why they came to be as they are. It is the simple truth that in Mr. Baden-Powell's work the need has been adequately satisfied. But he has accomplished much more than what would have sufficed for departmental officers. His work, originally undertaken merely with the view of providing a manual for the guidance of officers of the Forest Department, whose work demands some understanding of tenures and of the revenue system, has now in its present enlarged form become an exhaustive and comprehensive treatise on the subject generally in its various aspects, and not only furnishes the information required by every class of Indian officials, but is a contribution of great value to the investigation of the development of the right of property in land, and will take rank as an authority on the difficult questions with which it deals. He has not been sparing of labour in his research; he shows himself acquainted with the latest theories on the origin and development of rights in land in other countries; but while he is able to draw illustrations from every province of India, he is cautious in generalising from individual instances, and is careful to respect facts and not to adapt them to a pre-conceived theory. His conclusions on some important points are opposed to those of older authorities on the subject of land-tenures in India; but he is careful to point out that their mistakes were due only to their not having the abundant materials we now possess on which to base a sound inductive theory, or because it was impossible for them to escape the misleading influence of western analogies. The manual is altogether a very thorough piece of work and complete in itself, containing as it does a lucid explanation of everything which is necessary for an understanding of the subject. It is furnished with an index of subjects and a vernacular index and glossary.

Rulers of India: Lord William Bentinck. By Demetrius C. Boulger, Author of *The History of China*, etc. Oxford: At the Clarendon Press, 1892. Pp. 214. *Price* 2*s.* 6*d.*

Lord William Bentinck was not a man of commanding ability, and his tenure of office was not marked by startling incidents of war and conquest. But his administration was one of the most important of the factors that have produced the India of to-day, and the aims and tendency of that administration were powerfully influenced by his personality and character. It is now evident that it inaugurated a new era, and he therefore is very properly given a place in the series of Rulers of India. His predecessors, Wellesley and Hastings, had beaten down opposing powers, built up a new Empire, and made British influence supreme in India. It was now possible to give more attention to internal administration, and the need for this was imperative. Empire had been won, but to ensure its stability and permanence it was of urgent necessity that internal organisation be wisely regulated, practices discreditable to a civilised government repressed, and provision made, by education and the enlistment of natives in the administration, for peaceful orderly progress and loyal acceptance of the rule of a foreign power. This was the task to which Bentinck devoted himself, and it has been Mr. Boulger's aim to show with what success and in what spirit he applied himself to it. The book contains a brief but lucid and sufficient account of the more important transactions of Bentinck's administration, noting with special attention his proceedings with reference to the finances, the suppression of Thaggi and of Sati, the extended employment of native agency, and the introduction of

English as the official language of the Indian government and the vehicle of the higher education. By publishing in full the minutes on the question of Sati, and on the constitution of the army, Mr. Boulger has done more for Bentinck's reputation than any highly-wrought eulogy could have effected, and has given every reader the opportunity of seeing for himself that Bentinck in his policy was guided by more prudence, sagacity, and well-balanced judgment than many critics of his character have given him credit for, and that the nobility and liberality of his aims were not more conspicuous than his good sense and shrewdness of insight. Mr. Boulger undertook a more difficult task than that of others who had to describe careers, the incidents of which alone excite the interest of the reader, but he has accomplished it in a way which merits warm commendation. He has made the subject both intelligible and interesting, and by a simple exposition of the facts has vindicated for Bentinck the right to an honourable and enduring place amongst Rulers of India.

Rulers of India: Ranjit Singh. By Sir Lepel Griffin, K.C.S.I. Oxford: At the Clarendon Press, 1892. Pp. 223. *Price* 2*s.* 6*d.*

In the recent history of India no people has played a more conspicuous part than the Sikhs, and the series of monographs on Rulers of India would have been incomplete if it had not included one devoted to the rise of the warlike sect, and to the career of the vigorous, ruthless, and sagacious prince whose military and administrative genius enabled him to beat down rival chiefs, to weld together the various discordant confederacies into a homogeneous nation, and to establish his rule as absolute sovereign over the whole Punjab proper, from the Sutlej to the Indus. Than Sir Lepel Griffin no one could have been found more competent to handle the subject. Through his intimate personal acquaintance with all the noble families to which the principal actors in the stirring events of the time belonged he obtained access to sources of information not open to others, and several years of his official life were devoted to research (for which he had every desirable advantage) into the history of the province. In the sketch which he has now contributed to the series there is, however, not merely fulness and accuracy of knowledge: more marked even than this are the manly independent criticism, the animated narrative, and the clear vigorous style. In successive chapters are described the Sikhs, the rise of the Sikh Theocracy, and their characteristic tenets; the state of the Punjab at Ranjit Singh's birth; Ranjit Singh and his character as a man; the courtiers and chiefs who surrounded him; his army and administration; his early and later conquests; and his relations with the Cis-Sutlej territory and the English power. Sir Lepel Griffin is probably correct in his view that a dry record of the campaigns fought by the Maharaja, and of the principalities he annexed, would have had little interest for the English reader, and the detailed narratives of the more important conquests are amply sufficient for the object of the work. But, if he had also given a brief outline showing the various enterprises and achievements in chronological order it would have been easier to follow and appreciate the growth of the Maharaja's power. The absence of such a chronological scheme, which would not have occupied much space, is the only thing that detracts from the effectiveness of the chapters on Ranjit's career as a conqueror. The map of India, which accompanies the volume, is on too small a scale to be of much use to the reader. More useful would have been a map of only the Punjab on a larger scale showing the various districts, tribal and political subdivisions, which are referred to in the text.

James Gilmour of Mongolia: His Diaries, Letters, and Reports. Edited and Arranged by RICHARD LOVETT, M.A. With three Portraits, two Maps, and four Illustrations. London: The Religious Tract Society, 1892.

Among the many remarkable Scotsmen who have gone forth as missionaries and missionary travellers, James Gilmour stands out as "the missionary Defoe." On his first visit home in 1882 he wrote an account of his journeyings *Among the Mongols* with such realistic power and simplicity that the *Spectator* declared "there has been no book quite like this book since *Robinson Crusoe*." Mr. Lovett has edited his letters with much literary skill; and geographers, as well as others, will find the book to be of value.

The Year-book of the Imperial Institute, 1892. London. Pp. 824.

This is the first issue of an annual that promises to develop into a standard work of reference. It combines the leading features of such well-known volumes as the *Statesman's Year-book*, *Colonial Office List*, *Year-book of Commerce*, *Colonial Year-book*, etc., adapted to the special requirements of the Imperial Institute. Its imposing proportions are somewhat against it, and are scarcely justified by the actual amount of information it conveys, but, doubtless, in future issues, economy of space and literary proportion will be more carefully considered. As it stands, the book is not cast in the best mould to bear the frequent corrections that year by year must of necessity arise, nor has sufficient attention been given to uniformity in the rubrics, and, in spite of side-notes, to the ordinary aids to reference. There is no index to help the reader in this respect, but only a meagre list of contents.

The compiler, Mr. J. R. FitzGerald, has accomplished his work with praiseworthy attention to detail and accuracy, but Sir Frederick Abel and Sir Somers Vine appear to be responsible for the general arrangement of the book. In this respect, we think, there is room for improvement. All those to whom such a volume appeals must still have recourse to the standard year-books: it could not, without becoming even bulkier than it now is, be sufficiently comprehensive in itself to enable the reader to dispense with its competitors in the same field. Not that it is without original features of its own, but these might, with advantage, have been extended and amplified. Its special value appears to us to lie in the discussion of commercial statistics, and some of the illustrative diagrams are really admirable productions. The section dealing with India is particularly well done. We are surprised, however, to note the absence of such subjects as colonial tariffs, and new administrative measures and treaties affecting the Colonies, which might have been dealt with profitably and illustrated by special maps or diagrams. Some attention, too, might have been given to a discussion of the British Consular reports for the year. In a word, the volume would have gained in value by becoming a record of progress and development rather than a manual of reference. We are already fairly well provided in the latter respect, but sadly want an authoritative work setting forth the annual progress of the British Empire.

The sections "Australasia" and "Miscellaneous" do not conform to the geographical arrangement of the book. Why not introduce the common geographical term "Oceania," and exclude the clumsy designation of "Miscellaneous" Possessions of Great Britain? Somali-land, Perim, Sokotra and Aden should also have been included under the geographical rather than the administrative arrangement. Lastly, the section dealing with foreign countries were better omitted altogether, since the *Statesman's Year-book* is good enough for most people. We note a common error in this portion of the book,—Austro-Hungary for Austria-Hungary.

The illustrative map of the World is, we are told in Sir Frederick Abel's Preface, only a make-shift; a better one is to accompany future issues of the Year-book.

L'Homme dans la Nature. Par Paul Topinard, ancien secrétaire-général de la Société d'Anthropologie. Paris, 1891. Pp. viii + 352.

This is one of the excellent popular scientific works published under the title of the "Bibliothèque Scientifique Internationale." The editor may be congratulated on securing the services of Dr. Topinard for the volume on Anthropology, for he is one of the ablest and most energetic workers in this department of science.

Dr. Topinard is known to English readers as the author of a work on Anthropology published in 1877 in the Library of Contemporary Science, and the work at present under review may be regarded as essentially a new edition of that treatise, although it differs in several respects in its mode of dealing with the subject. Its essentially French character will be evident from the title of the first chapter, which contains an historical sketch of anthropology, viz. "L'Anthropologie avant Broca.—Période de Broca.—Période actuelle." The influence of Broca in anthropology was undoubtedly immense, and it is natural that Dr. Topinard as his pupil should give due prominence to his master's work; still, in an international scientific treatise we might expect a little more attention to be paid to the researches of those belonging to other nationalities. Thus, Virchow's name is only mentioned once or twice, and no indications are given of his contributions to anthropology. Topinard is apparently more familiar with, or more disposed to recognise, the works of English anthropologists, for he frequently alludes to the views of Huxley, Flower, and Turner. He considers the period from the establishment of the Anthropological Society of Paris in 1859 to the death of Broca in 1880 as especially characterised by the influence which French anthropology exerted upon other countries. During this time the French anthropologists were divided into two schools, one represented by M. de Quatrefages and the other by M. Broca. The former was "monogéniste et anti-transformiste," and the latter "caressant surtout celle [théorie] de la descendance de l'Homme du Singe." Topinard is an ardent supporter of the school of Broca. He complains that since the death of Broca a section of this school have abandoned the traditions of their master, and instead of limiting the scope of anthropology to its zoological aspects have extended it so as to embrace psychology and sociology.

It is beyond the space allotted to this review to discuss the methods adopted by Topinard in the examination of the physical peculiarities of the various races of mankind. We need only say that this part of the work gives abundant evidence of the author's skill and practical knowledge.

Norway and the Norwegians. By C. F. Keary, M.A., F.S.A., Author of *The Vikings in Western Christendom*, *The Mythology of the Eddas*, etc. London: Percival and Co., 1892. Pp. xvi. + 408. *Price* 5*s.*

The purpose of the author in writing this book was, in his own words, to supply "those items of information which the most sharp-sighted traveller could not get from observation alone; some of those links which unite the Norway of to-day to the Norway of the past, and the parts of the existing life of the country visible to the eye to other parts which the mere tourist cannot participate in, the life of politics, of industry, of literature, which belongs to the inhabitants of a country, but not to the visitors to it." This purpose has been the occasion of a book that will doubtless be welcome to many of those who in the last few years have crossed the North Sea—the turning of the tide which reached our shores

eleven centuries ago—to visit the long-neglected scenic splendours of *Gamle Norge*. Mr. Keary's knowledge, painstaking care, and conscientious thoroughness, deserve every recognition that gratified pleasure can confer. Within the limits at his disposal, and the natural restrictions of the plan he marked out for himself—conditions it is essential to remember—he has put together a good readable account of the country and its people, their history, their institutions, their achievements by land and sea, their politics, religion, education, social condition, and so forth. In writing on the ancient Viking age, its history and its mythology, Mr. Keary is on ground that is familiar to him from his special studies. Indeed, the history is very well done altogether ; and in this division of the subject there are only two points that call for remark. In the period that intervenes between the fifteenth and the nineteenth centuries, the proportions of historical perspective would, we believe, have been better observed if something more had been told us about the internal condition of the country, for which space might easily have been found by cutting out passages dealing with the long rivalry between Sweden and Denmark. Then the events—very important events in the history of Norway—that immediately preceded and followed the union of 1814 are dismissed in all too brief and curt a manner. The chapters describing the present political and social condition of the country are probably the best done in the whole book. But certainly the least satisfactory is the chapter treating of Norwegian literature. That the reader must be warned to read with the wariest circumspection. To say nothing of actual inaccuracies (e.g. *Mellem Drabningerne* instead of *Mellem Slagene*, and some others), the parallelism (if not imitation) more than hinted at between Björnson and Ibsen and Schiller and Goethe is of the flimsiest and most superficial character. *Peer Gynt*, for instance, was suggested, as Mr. Keary surely knows, by a genuine Norwegian folk-tale. No reader would gather from Mr. Keary's words that Norway had been, during the last few years, the scene of one of the most interesting as well as vigorous literary movements, or rather contests, in modern times. This chapter can hardly have been written at first-hand knowledge ; there are but few statements that could pass wholly without challenge. We are glad to find that Mr. Keary has consulted Eilert Sundt's books on the social condition of the Norwegians. In the course of our reading we noticed a good many misprints and slips, of which, however, we can only quote the more glaring :— The map of Bergen should have been dated, especially as it bears unmistakable evidence of having been made during the dominance of the Hansa. Iceland belongs at the present time, and has belonged since 1388, to Denmark, not to Norway (p. 291). "Ireland," at the bottom of p. 54, should, of course, be "Iceland." Unless we err greatly, Jostedalsbrae considerably exceeds 350 square miles in area (p. 25). Scania (Skane) should certainly have been named on the map of Historic Norway. The concluding chapter, pleasantly written by Miss E. Tindall, gives an account of the flora of Norway ; though the reader who is interested in the forest trees should have been told something, as well as referred to Schübeler's *Norges Væxtrige*. Four separate indexes (one would have been easier to consult) enhance the value of the book as a work of reference. The book has no printer's imprint, and bears internal evidence of having been printed abroad ; if so, it is a creditable performance for whoever did it.

Through Northern Seas : A Trip to the Land of the Midnight Sun. By William Winter Campion. Third Edition. London : Jarrold and Sons, n.d. Pp. 158.

When the most conspicuous merit of a book is that it is consistently *banal* throughout, the reviewer's task is tolerably easy. This remark applies with peculiar

pertinency to Mr. Campion's production. It is simply Mr. Campion's personal account of a trip to Norway in a certain steam-yacht in 1891. Amongst other things to be found between the covers are a poem of Will Carleton's (14 pp. long), the names of the lady passengers on board the said yacht who took part in athletic sports on deck, a gratuitous puff of the *Detroit Free Press*, a proper consideration for those who think much of their creature comforts, a few misspellings of Norwegian proper names (pp. 47, 54), and some exceptionally creditable engravings, including a *Group of Victoria Passengers*—hence perhaps the "Third Edition" on the title-page.

Six Months in the Apennines; or, a Pilgrimage in Search of Vestiges of the Irish Saints in Italy. Illustrated. By MARGARET STOKES. London and New York: George Bell and Sons, 1892. Pp. xiv+313. *Price* 15*s. net.*

Miss Stokes' work is of interest rather to the antiquarian and historian than the geographer. It deals chiefly with churches, architecture, and ecclesiastical legends, and remarks on country and scenery are seldom met with. We can, therefore, do no more than state that the authoress has spared no labour in her investigations, and that the information is conveyed in an attractive style. The publishers deserve praise for producing a well-printed and tastefully bound volume.

La Sicilia illustrata nella Storia, nell'Arte, nei Paesi. Per GUSTAVO CHIESI. Edizione adorna da 336 finissime incisioni dal vero. Milano: Edoardo Sonzogno, 1892. Pp. viii+720.

There is no country in Europe which possesses such varied attractions as Sicily. Its natural beauties are of no mean order, but its chief interest is connected with historic memories and the works of art left by the numerous nations that have at one time or other gained a footing on its shores. Greeks, Carthaginians, Romans, Saracens, and even the more northern nations of Europe have helped to fill the pages of Sicilian history. In his elaborate work Signor Chiesi records the principal events of this chequered history from classic times down to the expedition of Garibaldi and the "Thousand," each narrative accompanying a description of the site where the event took place. We have also descriptions of the architectural works with which the island abounds—Greek, Carthaginian, Roman, Norman, and Italian—from the simple and elegant temple of Segesta to the heavy tasteless monument to Garibaldi and his followers. Statues, vases, mosaics, paintings, and other smaller art-products, many of them possessing great beauty, are among the treasures of the island, and find a place in these pages. If to these subjects be added the modern inhabitants, their customs and daily life, Etna and its eruptions, legends, and various other minor themes, it may be imagined that Signor Chiesi has no lack of material to fill even this large volume. His work is confessedly descriptive and popular, and therefore few doubtful questions of history or art are fully discussed, nor can we criticise the one or two statements which we are not disposed to accept as correct. The tourist in Sicily will find it a most entertaining companion, and an excellent guide to all that is interesting in the island. The author describes Sicily as he himself saw it, and, as he arrives at each place, he gives all particulars relating to it, whether historical, artistic, or descriptive, so that the reader finds constant variety.

The illustrations are very good, and add much to the value of the work, but the map is not worthy to appear beside them. We are surprised to find that they are not indexed.

La Grèce d'aujourd'hui. Par Gaston Deschamps. Paris : Armand Colin et Cie., 1892. Pp. 388.

We have here a little of everything—chapters on the government, politics, and newspapers, accounts of trials, descriptions of town and country, scraps of history, tales of brigandage, and notes on language, religion, archæology, and a host of other subjects. Written in an easy, chatty style, and interspersed with numerous anecdotes and digressions, this book depicts in broad outlines the present state of Greece as it appears to the ordinary traveller, and will find favour with those readers who wish to acquire a general idea of Greek life and institutions without troubling themselves with abstruse questions.

Arakan : Past—Present—Future. A Résumé of Two Campaigns for its Development. By John Ogilvy Hay, J.P. (Old Arakan.) With Map. Edinburgh and London : William Blackwood and Sons, 1892. *Price* 4*s.* 6*d.*

Mr. J. Ogilvy Hay's *Arakan* is an account, with relative documents, of two determined efforts made by him when Honorary Magistrate of the town of Akyab, on the Arakan coast, to have the capabilities of that place as a seaport developed, so that it might become an outlet for the trade of Eastern Burma, and a connecting link between India on the one hand and Western China on the other. No one who dips, however lightly, into Mr. Hay's book can doubt that he is strongly convinced of the desirability of the course he recommends, or that he is thoroughly in earnest in recommending it. It is evidently, in his view, the one thing in the world that remains to be accomplished in order to establish the greatness of the British Empire in India. He has pressed and badgered successive Governments on the subject, until his sobriquet of "Old Arakan" must have struck them with dismay. Those who are interested in the subject, which has important bearings on commercial geography, will find in the volume much useful information.

Toil and Travel. By John MacGregor, M.D. (Ralph). London : T. Fisher Unwin, 1892. Pp. 335.

In this volume, the author, a Surgeon-Major in the Bombay Army, narrates his homeward voyage round the world. In pleasant gossipy language he describes what he saw and heard in Australia, New Zealand, Java, China, Japan, Mexico, and the United States. He visited Pekin, after providing himself with a Chinese passport, which is reproduced. He found Pekin exceedingly dirty. From there he visited the Great Wall of China and the Ming Tombs, which he considers "far the most interesting monuments to be seen in this the most interesting part of China." After a peep at Corea and Vladivostok, our traveller proceeded to Japan, where he found that, in spite of Sir Edwin Arnold, "both Shintoism and Buddhism are fast dying out." At Yokohama he met a "vision in tartans," who proved to be none other than Miss Nellie Bly, who was at that time racing round the world for the glory of an American newspaper. With her Dr. MacGregor crossed to San Francisco, and from thence he proceeded to Mexico, where he ascended Popocatepetl (18,000 ft.) with "Kenneth, the stockrider." Through the United States and England he made his way to Scotland, and, like a true MacGregor, finished his thirteen months' voyage at the grave of Rob Roy.

De Barcelonnette au Mexique. Par Emile Chabrand. Paris : E. Plon, Nourrit et Cie., 1892. Pp. 472.

M. Chabrand has written an interesting description of a journey round the world, during which he visited India, Burma, China, Japan, the United States, and

Mexico. There is little in the book that is not to be found in other works of travel, but a great variety of information has been collected which to many readers will be new. Mexico is treated in greater detail, as M. Chabrand resided there for some years, and perhaps the most interesting chapter is that which describes a night spent in the crater of Popocatepetl. The illustrations, forty in number, add to the attractions of the work.

New Zealand's Lone Lands: Being Brief Notes of a Visit to the Outlying Islands of the Colony. By Ro. Carrick. Wellington: George Didsbury, Government Printer, 1892. Pp. vi + 71.

The information contained in this report forms an admirable addition to that already contained in the best Sailing Directories. The style, intended to be humorous, is not, it is true, that which we anticipate in a work of the kind, but it may pass unchallenged when consideration is had to the value of the report itself. The maps, if rough, are distinct, and the illustrations are fairly well executed.

Aorangi; or, The Heart of the Southern Alps, New Zealand. By Malcolm Ross. Wellington: George Didsbury, Government Printer, 1892. Pp. 64.

The Government of New Zealand, feeling that the Mount Cook district, with its fine scenery and other attractions, was not sufficiently well known to tourists and visitors, suggested to the author, who is vice-president of the New Zealand Alpine Club, the desirability of producing a guide-book to Aorangi. The result is before us. It is an excellent and well-arranged handbook, and we recommend it, although we cannot agree with the author that the drawings have been well reproduced. The maps, however, are excellent, and reflect credit on the department.

The London Geographical Series: A School Physical and Descriptive Geography. By Keith Johnston, F.R.G.S. Maps and Illustrations. Sixth Edition, Revised by A. H. Keane. London: Edward Stanford, 1892. *Price 6s.*

The late Keith Johnston's *Physical and Descriptive Geography* was originally issued in 1881, and it was at that time a great advance on text-books of the kind, especially in the prominence it gave to physical features as the foundation of all geographical treatment. The sixth edition of the book, revised by Professor Keane, is now before us; and it says much for the accuracy and thoroughness with which Keith Johnston executed his task that his editor has had to make very few alterations on the text, excepting those relating to population and those necessitated by actual territorial changes. The book is, in fact, scarcely one page larger than it was ten years ago. The amendments have been made with skill and judgment.

Eastern Geography: A Geography of the Malay Peninsula, Indo-China, The Eastern Archipelago, The Philippines, and New Guinea. By Professor A. H. Keane, B.A., F.R.G.S. With a Map. Second Edition, Revised. London: Edward Stanford, 1892.

This is a revised edition of Professor Keane's manual of *Eastern Geography*, issued in 1887. The revision has consisted chiefly in the correction of *errata*, and in bringing the statistics down to date. The populations, which in the former edition were those for 1880 and 1881, are now those of 1887-88 for the majority of cases, and for the British Possessions those of 1891. The new matter does not amount to much, making a difference of only two pages in the volume. It comprises paragraphs on the Siamese language and Buddhist temples, and on the

mineral resources of Siam. The book is a very useful one, and the fact that it has gone into a second edition shows that its worth has been appreciated. An alphabetical index would have added greatly to its value.

Elementary Geography. By James Clyde, M.A., LL.D. With Appendix on Sacred Geography, and five Coloured Maps. Twenty-fifth edition. Edinburgh: Oliver and Boyd, Tweeddale Court, 1892.

A book that has reached its twenty-fifth edition must be to a large extent independent of criticism. This success in the case of Dr. Clyde's *Elementary Geography* is well deserved. It is only necessary to note that in the present edition the book has been recast so as to give prominence to the industries and commerce of the world, particularly in their relations to the British Isles and the British Colonies.

A Synoptical Geography of the World. London: Blackie and Son Limited, 1892.

This *Synoptical Geography* is another of those compilations of the *pemmican* class that the examination system seems to have rendered necessary. Every page is a mass of names, figures, and facts, arranged in the manner deemed most convenient for the memory. The sub-title describes the little book as "a concise handbook for rapid revisal in preparing for examinations, and for general reference." The book may serve these purposes, but such books do not promote sound education in or through geography.

Records of the Australian Museum, vol. ii., No. 1. Sydney, April 1892.

The present number of the *Records* includes a paper "On a Tubicolous Amphipod from Port Jackson," by Chas. Chilton, M.A. The author reviews the genus *Cerapus*, and gives details respecting the morphology of the species referred to in the title of the paper, *Cerapus flinderi*. The description is accompanied by a lithographed plate drawn by the author.

A "Description of Three New Australian Lizards," by J. Douglas Ogilby, comes next, and is followed by a "Supplement to the Descriptive Catalogue of 'Nests and Eggs of Birds found breeding in Australia and Tasmania'" [Part ii., April 1892], by A. J. North, F.L.S. This paper is illustrated by a heliotype figure of the nest and eggs of the Bridled Honeyeater, *Ptilotis frenata*, Ramsay.

A "Note on the Occurrence of the Sanderling, *Calidris arenaria*, in New South Wales," by Professor Alfred Newton, concludes the Number.

Some Rambles round Edinburgh. By John Christison Oliphant. Edinburgh: Macniven and Wallace, 1892. Pp. xii + 56. *Price* 1*s. nett.*

In a series of well-described excursions Mr. Oliphant conducts the reader to Corstorphine, Corstorphine Hill, the western suburbs, Colinton, Glencorse, and round Arthur's Seat. The matter, if not very detailed, is always suggestive, and the information is conveyed in a most interesting and pleasing style. The little book is got up as a pocket-volume, and no better companion need be sought for in the walks described within its covers. Parts of the contents have already appeared in another form, but these have been revised, and the chapter on Arthur's Seat is entirely new.

The Illustrated Guide to Rosslyn Chapel and Castle, Hawthornden, &c. By the Rev. John Thompson, F.S.A. Edinburgh: St. Giles' Printing Company, 1892.

The Reverend Chaplain to the Earl of Rosslyn has here produced a very complete and intelligent guide to the whole Rosslyn district—the Village, the Chapel,

the Castle, the Glen, and Hawthornden, with the addition of notes on the Saintclairs of Rosslyn, and on Gorton House. The illustrations are superior to those usually found in books of the kind; and the map, by Bartholomew, is all that could be desired.

Lasswade Parish and Loanhead in the Olden Time. By Christopher Aitchison. Edinburgh: Andrew Elliot. Lasswade: George Storie, 1892. Pp. 31.

As it is evident that the author has had access to numerous records of the past not easily seen by the general public, it seems a pity that he did not enlarge and extend his very interesting little lecture before publication. Perhaps he may yet be induced to do so, and we should welcome a work of the kind. When unpublished original papers can be consulted, it is always well to put them into some permanent form, and Mr. Aitchison appears well qualified to undertake such a task. The present little work ought to prove of interest in the locality described.

The Rhine from Rotterdam to Constance. Handbook for Travellers. By K. Baedeker. Twelfth Revised Edition. London: Dulau and Co., 1892. Pp. xxxiv + 396. With 39 Maps and 21 Plans. *Price* 7 *M.*

These guides require no recommendation. Their well-deserved reputation has long been established. It is only necessary to say that the present edition contains improved maps and plans, and more detailed information about the less frequented parts of the country.

The Chain of Mont Blanc. By Louis Kurz. London: T. Fisher Unwin, 1892. Pp. 143. *Price* 10*s.*

The Lepontine Alps. By William Martin Conway and W. A. B. Coolidge. London: T. Fisher Unwin, 1892. Pp. 106. *Price* 10*s.*

The Central Alps of the Dauphiny. By W. A. B. Coolidge, H. Duhamel, and F. Perrin. London: T. Fisher Unwin, 1892. Pp. 248. *Price* 10*s.*

Maps of the Dauphiny Alps. London: T. Fisher Unwin, 1892. (*Climbers' Guides*).

These are thoroughly practical guides, written by experts for experts in mountain-climbing, and cannot be sufficiently praised for their workman-like character. They are strongly bound, to resist the hardest wear and tear, and should be in the hands (or, rather, in the pocket) of every climber, to whom they are all but indispensable. The maps are very clear and good.

O'Shea's Guide to Spain and Portugal. Edited by John Lomas. Ninth edition. London and Edinburgh: A. and C. Black, 1892. Pp. cxiii. + 562. *Price* 15*s.*

The editor states that he made this year a fresh tour through the Peninsula for the purpose of revising this admirable Guide. It is, accordingly, very complete indeed. We observe that the Spanish currency of *pesetas* and *centimos* has everywhere been substituted for the old *reals* and *centaros*, which greatly improves the Guide. The map of the Peninsula has also been revised, and new railway lines have been added. We have examined the Guide closely, and found it exact, even to the smallest detail; although the editor's remark that all hotel "rates are liable to be doubled during Holy Week" in Seville, should, we think, be read as follows: "All hotel rates and cab fares are doubled during Holy Week and the Fair in Seville." The cabmen's printed tables bear an official announcement to this effect. We commend this Guide Book also for its handy portable form, and its excellent printing by R. and R. Clark. The maps and plans are by J. Bartholomew.

NEW MAPS.

EUROPE.

SCOTLAND, Reduced Ordnance Survey of——. By John Bartholomew. New Series. Coloured for Tourists and Cyclists. Sheet 16 : Braemar and Blair Athole ; Sheet 19 : Isle of Skye ; Sheet 22 : Peterhead and Banff.
John Bartholomew & Co., The Edinburgh Geographical Institute.

SCOTLAND, Bacon's New Sixpenny Series of Popular Maps. From the latest authorities, 1892. Scale, 1 : 792,000. *London : G. W. Bacon & Co., Ltd.*

It is very unfortunate for the progress of cartography in this country, no less than for an uncritical public, that maps of this sort are offered for sale. It is the worst example—in spite of its being 'from the latest authorities'—we have seen for some time ; and we cannot allow it to pass unnoticed. The outline of the coasts, rivers, etc., is so inaccurately drawn that in many places it is literally 'miles out' : *e.g.* Lewis and Harris. In the spelling of place-names we find such examples as L. Keith (for Inchkeith), Pto. Bello (for Portobello), L. Katherine (for Loch Katrine), Ardleesh (for Ardlui), Rh. Hood's Cave (for Rob Roy's Cave, Loch Lomond), etc. Prominence is given to places of no importance, while many small villages are represented in large lettering. There are omissions such as Ardrishaig, Millport, Pitlochry, Trossachs, Beattock, Strathpeffer, Forth Bridge, Moorfoot Hills, Cheviots, etc. The new county boundaries are ignored. The lakes have no distinctive colouring, except Loch Lomond, and the chief peaks or mountain-masses are not indicated.

Such maps as this, no doubt, are bought ; but we deplore the ignorance of our public, which cannot at once detect so glaring an example of bad work—for which the low price of the map is no excuse. Map-publishers are thereby tempted to foist old plates upon the market rather than go to the expense of correcting them or producing new ones ; and the result is that all honest efforts at improvement are discouraged.

ANDORRA, Mapa de las Valles de——. Constructed by F. H. Deverell, 1890. Based on the French Ordnance Survey Maps. (Carte de l'État-major), 1 : 80,000. *London : Simpkin, Marshall, and Co.*

This map, based on the French survey, contains the political divisions into Paroquias, and shows the mule-tracks by red lines. The hills are not drawn so effectively as might have been expected. Explanatory letterpress, giving an interesting account of the History, and the Physical and Political Geography, of Andorra accompanies the map.

AFRICA.

DEUTSCH OST-AFRIKA, Karte von——. Massstab 1 : 1,000,000. Zweite verbesserte Auflage. *Berlin : Deutsche Kolonialgesellschaft.*

This is a wall-map of German East Africa—the first of its kind—and is published by the German Colonial Society. The map embraces the area between long. 29° and 41° east of Greenwich, and between lat. 1° north and 15° south. It consists of six large sheets. The political boundaries are laid down according to the latest Agreements ; the lettering is in a bold style ; the hills are shaded, and printed in brown. All mission-stations are specially marked, and distinguished as Protestant or Roman Catholic. The map is very well executed, and is in every respect up to date ; all available authorities have been consulted. It will undoubtedly prove very useful for the purpose for which it has been designed.

NORTH AMERICA.

UNITED STATES, Geological Survey of the——. J. Powell, Director.

General Maps.

United States, Contour Map of the——. Compiled by Henry Gannet. *Scale*, 1 : 6,969,600.

Scale, 1 : 62,500.

Connecticut: Cornwall, Danbury, Granby, Hartford, New London, Tolland, Winsted.
Florida: Arredondo.
Illinois: Joliet, Marseilles, Morris, Ottawa, Wilmington.
Louisiana: Chef Menteur, Cheniere Caminada, Cut-Off, St. Bernard.
Maine: Augusta, Freeport, Gardiner.
Maryland—District of Columbia—Virginia: Washington.
Maryland: Ellicott, Laurel, Leonardtown.
Maryland—Virginia: Piney Point.
New York: Tarrytown.
New York—New Jersey: New York.
Pennsylvania: Harrisburg, Hummelstown, Pine Grove.
Wisconsin: Port Washington, Racine, Waukesha.

Scale, 1 : 125,000.

Colorado: Denver, Huerfano Park, Mount Carrizo.
Idaho: Bisuka, Boise, Mountain Home.
Kansas: Coldwater, Concordia, Dodge, Meade, Minneapolis.
Kentucky: Beattyville.
Montana: Stillwater.
New Mexico: Santa Fé.
Nevada: Wadsworth.
Ohio—West Virginia: Huntington.
Tennessee: Pikeville.
Texas: Eden, San Angelo, Waco.
Virginia: Lynchburg.

CENTRAL AMERICA.

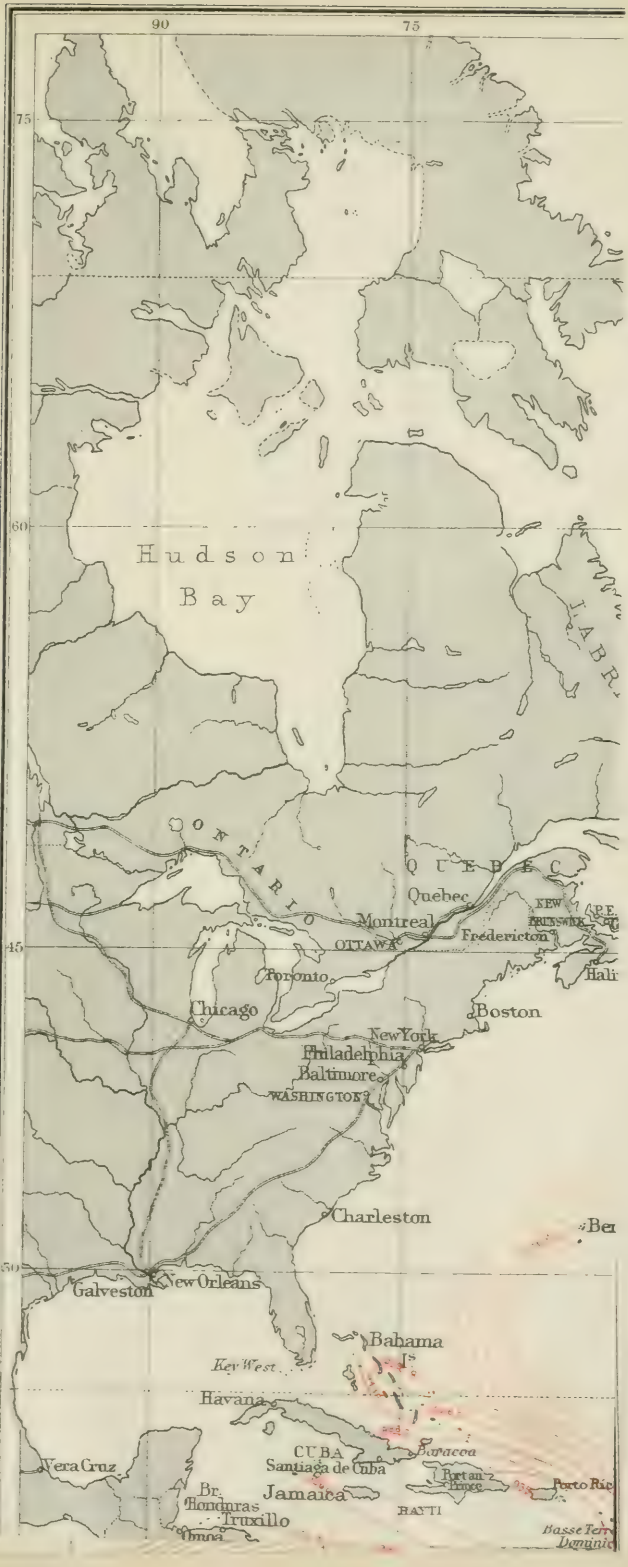
HONDURAS ET DU SALVADOR, Carte Commerciale du——. Par F. Bianconi, Ingénieur-Géographe. Echelle, 1 : 1,000,000. Amérique, No. 4, 1891.

Paris: Publiée par la Librairie Chair.

This new map of Honduras and Salvador belongs to M. Bianconi's well-known series of commercial maps, and has been compiled in collaboration with M. Louis Gaubert, Consul-General for Honduras in Paris. It is based on A. F. Byrne's map of Honduras and G. J. Lawson's map of Salvador. The map is very clear, and nicely drawn; the rivers are in blue, and the hills, which are shaded, in brown. The boundaries of the twelve departments in Honduras, as well as those of the fourteen departments of Salvador, are shown by red dotted lines. The names of the chief products are printed in red on the map, while the mines are indicated by red crosses. Descriptive letterpress accompanies the map, dealing with the History, Physical Geography, Administration, Commerce, Industries, and Agriculture of both Republics.

SOUTH AMERICA.

ARGENTINISCHEN REPUBLIK, Reisen und Trigonometrische Aufnahmen in der ——in den Jahren, 1875-1888. Ausgeführt von Prof. Dr. Ludwig Brackebusch. Nebst Angabe des zur Construction seiner *Mapa de la Republica Argentina* im Massstab, 1 : 1,000,000, benutzten Materials. Massstab, 1 : 3,000,000. Tafel i. : Reiserouten und Karten-Material. Tafel ii. : Grundlinien und trigonometrische Punkte. *Petermann's Geographische Mitteilungen, Jahrgang* 1892, *Tafel* 14 *u.* 15. *Gotha: Justus Perthes.*


90
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NEW BRUNSWICK
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Montreal
OTTAWA
Fredericton
Toronto
Chicago
Boston
New York
Philadelphia
Baltimore
WASHINGTON
Charleston
Galveston
New Orleans
Bahama
Is.
Key West
Havana
CUBA
Santiago de Cuba
Vera Cruz
Br.
Honduras
Jamaica
Truxillo
Omoa
HAYTI
Porto Rico
Basse Terre
Dominica

Showing Results of the Prince of Monaco's Investigations, 1885-88.

— NOTE —

Tracks of the "Hirondelle"

Tracks of 1885 9 July to 31 August
1886 5 June 6 September
1887 21 May 24 August
1888 2 June 21 September

Supposed tracks and tracks of floats

1st year
2nd
3rd
Once taken

The Red figures indicate number of days taken by floats to transport tracks shown

Scottish Geographical Magazine 1892

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

EXPLORATIONS IN THE LOANGWA-ZAMBESI BASIN.

By Daniel J. Rankin, F.R.S.G.S., M.R.A.S.

(*With a Map.*)

Since I had last the honour of addressing this Society on the subject of the Zambesi and the Chinde, many radical changes have taken place in this at one time almost *terra incognita*. This huge waterway, from being a great expanse of solitariness and savagedom, has now become a highway busy with traffic and movement. Towns are rapidly springing up along its banks, and civilisation and commercial enterprise are augmenting daily. It has been a source of gratification to me to notice that my labours in this part have not been without value, seeing that without the discovery of the Chinde mouth this huge and rich region would in all probability have remained covered with the pall of stagnation and barbarism that has for so many centuries hidden it from civilisation. The most superficial glance at the unique facilities for communication and transport obtaining in this vast region, the suitableness of the interior countries for white residence, and their known agricultural and mineral wealth, will show how bright a future lies before it. In this paper[1] I would attempt to place before you some of the most important results of my work of exploration during the past two years. In the middle of 1890 I reached the Zambesi, and proceeded to the Acabadassa falls in

[1] I have to express my acknowledgments to the following gentlemen, who very kindly favoured me with valuable information and hints in the construction of my map:—Lieut. A. H. Lyons, R.N.; Lieut. Eduardo Foa; C. Marshall, Esq.; G. Cox, Esq. I do not insert the large number of cross-bearings on which the map is really constructed, as these were plotted down on the spot. As my work on the Chinde with the prismatic compass was proved quite accurate by subsequent surveys, I have no hesitation in forwarding the present map made under the same conditions.

boats and canoes. The navigation of the main stream has no obstacle until that place is reached, the craft required being the same as those used on similar rivers, with a draught of some 18 to 24 inches. The distance from the Chinde to the Acabadassa is more than 300 miles. At the Chinde the river craft can go alongside the ocean vessels. Thus, with one transhipment, merchandise and produce have unrestricted and cheap water communication with home markets and with territories more than 1000 miles in the interior of Africa.

The river-banks for the first 100 miles are low and formed of alluvial deposit. I, indeed, consider it probable that at one time the Zambesi and Shiré rivers both met the sea at their present confluence, just as the rivers Busi and Tungwé now do to the southward. This alluvial region I have already described in past papers, and have spoken of its extreme fertility. From Sena the aspect of the country undergoes an entire change. In place of morass and alluvial *débris* are ranges of hills and mountains, and an atmosphere freer from the malaria and miasma that unfit the delta for white residence. At the Lupata narrows the stream decreases very considerably in width, and the great flood of the Zambesi, which lower down has the enormous width of 2 or 3 miles, is here in places scarcely more than 1000 yards across. It has been represented by some that these narrows offer the first obstacles to the navigation of the Zambesi. I have, however, taken the greatest pains to find out if at any time of the year steamers encounter any danger or difficulty in passing; and though I have navigated it at all seasons, both wet and dry, I have found to my satisfaction that, neither from the excessive current which one might suppose would be found in so narrow a gorge, nor from deep-lying rocks in the channel, is there any obstacle to be found from one extremity to the other, and that such vessels passing up the main stream do not encounter any difficulty of any kind from the Chinde mouth as far up as the Acabadassa falls. Indeed, the current in this gorge is during the dry season so imperceptible that I am unable to account for the phenomenon otherwise than by the supposition of an underground channel. At the southern extremity is a small precipitous island covered with the wild palm. Canoes and boats, which have hitherto been the only means of navigation, are accustomed here to obtain ropes of palm leaves for the purpose of passing up the gorge. The current in the wet season is sometimes too strong for these frail craft, propelled as they are by the most primitive of paddles, and having to be towed along from the steep rocks; and it is not uncommon for these green ropes to snap and the canoe or boat to be overturned in the eddies, so that lives are constantly being lost in the upward passage. Hence probably has originated the idea of danger to navigation in this part of the Zambesi. Craft which are properly manned and which can keep in the centre of the stream have none of these dangers, and can pass and repass in a deep and navigable channel. The banks are extremely picturesque, the hills at the side coming down sheer to the water's edge, and in some places terminating with a wall-like ledge of water-worn boulders. On many occasions game is seen standing over the craft among the vegetation on the overhanging precipices. At the northern extremity, where the gorge

ends, vast piles of mountainous walls rise sheer out of the river to a height of two or more thousand feet. Huge fissures filled with great trees and tendrils make up a picture of considerable beauty ; the bright brown and red colouring of the rocks, sprinkled with the green vegetation and reflected in the clear water, greatly enhances the beauty of the scene. It is here we enter upon the most valuable mineral deposits of this country. On the left bank, from the Lupata as far as the Acababassa, there is an extensive and most valuable region of coal formation, extending over an area of 300 to 500 square miles. One of the most valuable adjuncts to ensure the successful development of this coal region is the unique advantage it possesses of navigable communication with the coast, many of the coal deposits being within two or three hours of the waterway. The number of the steamers now plying on these rivers offers a ready and good market for a considerable output, while the Chinde allows it to be carried to coast steamers. The report of Mr. Lapierre on this coal deposit will show its great value in its suitability for the use of river craft and for heating tubular boilers ; while its value is very greatly enhanced by the unusual facilities obtained from its close proximity to a river having direct and unbroken communication with the sea. On the right bank, in the vicinity of the Luena river, will, I have little doubt, be found the best, cheapest, and most rapid means of reaching British territory in the south. There are no hopeless swamps, as at Beira and the coast, to pass over. The country is at a fair elevation, and the distance is not considerable when compared with the tedious route used from the south. The town of Tete has little interest for the traveller. It has in a great measure the appearance of being built on a huge refuse-heap. The houses are with few exceptions mere dilapidated huts. Those belonging to the better class of merchants are of moderate size and in fair repair. The population consists for the most part of one or two European merchants and officials, and a number of Goanese and negro soldiers. The garrison at times amounts to twenty-four men, in a huge fort capable of holding several thousand troops. A pleasant characteristic of the better class of merchants and officials in this town is their great hospitality and kindness to strangers ; and, at the time in which the relations between the Portuguese and ourselves were much strained, an Englishman arriving at Tete would have been treated with a kindness and consideration which would perhaps have been shown to him by few other nationalities under similar circumstances. The trade of Tete is mostly dependent on the ivory brought down by expeditions from the far interior, most of the native population in the vicinity of the town being professional hunters who are sent out with guns and ammunition for the purpose of shooting elephants. They are often away on their quest for one or more years before returning with the results of their work. Passing Tete, the country is flat in the immediate vicinity of the river, and on the left bank a few miles inland rise up tier after tier the highlands of the Makanga country. The land on the river bank is extremely prolific in orange, mango, and lime plantations, many of which stretch for miles in extent, giving a vast yield, though unfortunately they are turned to little commercial account. At the Boromo mission, 20 miles above Tete, are

stationed a number of Jesuits. Here the country again changes, and precipitous hills reach down to the water's edge on both sides. The channel, however, is deep, and possesses no obstacles to navigation. Proceeding further up, the river gradually narrows, and at the village of Massanangwe huge boulders of granite block up further navigation, and here the Acabababassa falls have their southern limit.[1] The line of route taken to avoid these falls is on the right bank, and the road extends for a distance of some 30 to 35 miles over a country that could be used for wagon transit. From the north of the Acabababassa there is no obstacle to navigation up to the town of Zumbo, whence there is uninterrupted navigation for 300 miles and more up the Loangwa river; and beyond this point a line of communication could be formed with the greatest facility to afford the inland regions a cheap and rapid means of transport to the coast.

The region lying in the Loangwa-Zambesi basin is made up of two or three kingdoms, of which Undi and Makanga are the chief. The Makanga country covers an area of some 14,000 square miles, and is bounded on the north and west by Undi territory, on the south by the Zambesi, on the west by the Luia river, and on the east by the Chikorongo. It is intersected by a fine tributary of the Zambesi, the Revugwe river, and it is on its banks that we find the most prolific soil for agriculture. This river in its upper waters drains an extremely rich auriferous region, while coal, iron, and copper are found from its source to its confluence. The Mavusi and the affluents of the Revugwe are at certain seasons of the year for the most part navigable for small craft, so that the prospects of the successful mineral and agricultural development of this country have advantages that are perhaps unique in similar districts in Africa. The tedious and expensive means of transport to the coal-fields and gold deposits in the south, tending so much as they have done to restrict their development, are here altogether absent; and this is perhaps the only place in Africa where navigable streams are to be found in the heart of an auriferous tract. The elevation of the Makanga country is from 2000 to 7000 and 8000 feet. It is entirely free from morass, and I have had amongst my followers few or no cases of malarial sickness. I was surprised, on reaching there, to find that wheaten bread was grown and made by the people, and also sugar, besides large quantities of rice and cereals. Amongst the fruits which are largely cultivated are mango, orange, lime, and pineapple, of which there are in their seasons vast quantities; indeed, the Makanga country can be taken as one of the richest and most healthy districts on the Zambesi, and it is only with a feeling of regret that one remembers how long it has been kept from civilisation through local political difficulties. Alluvial gold is obtained in nearly all the streams of this region, and in many parts are signs of old workings, which on account of local troubles

[1] I might mention with regard to the word Acabababassa the derivation given by Mr. Johnston—"cebra" and "baça," fancifully translated "break the spleen"—appears to me to be erroneous, the correct derivation being undoubtedly "acaba" and "bassa," signifying "work is finished," given to this place on account of the fact that at both ends the engagement of native transport on the river ceases, owing to the impossibility of proceeding further.

have been closed for many years, and, owing to the insecurity of trade, the natives have done little of late years in exporting alluvial gold. The gold region can be followed with the greatest facility from the Zambesi through the Makanga country to the upper waters of the Luia river in Undi's territory. Here are many signs of old workings, and abundant proofs of the existence of auriferous deposit.

The people inhabiting this region belong to the great tribe Mañganja from the west coast of Lake Nyassa; indeed, this tribe is found over the whole length of the Zambesi from the Loangwa river to the delta. The language differs little from that spoken on the shores of the lake. In the Makanga country we find a very large admixture of Swahili and Portuguese. At Undi there are more signs of Arab influence in the language than Portuguese. The greater part of the trade of this country falls into the hands of Arab merchants, who are constantly traversing the country with large caravans from Zanzibar and German ports on the east coast. The inhabitants of Undi's territory and that to the north of the Makanga have for the most part fixed their dwellings on the most inaccessible and highest peaks to be found dotted over the country, being constantly harassed by the marauding tribe of Angoni. These latter have been for many years past the scourge of this country, and it will be the duty of those seeking to open up this district to enforce the discontinuance of their raiding excursions. Every year large parties of the Angoni are to be found pillaging and ravaging the whole country, destroying the native gardens, and, when possible, killing the inhabitants and carrying young women and men away as slaves. The Makanga, however, have for many years proved themselves to be a self-contained and powerful people. This is mainly owing to the large quantities of guns and ammunition they possess. They are by no means a marauding people, but have showed themselves on many occasions determined to fight for their national independence and freedom.

Travelling further eastward towards the Shiré river, we arrive on the water-shed in the country of the Chikorongo people, formerly under the chief Chibisa, and now governed by his son. This chief was the one ruling at the time Dr. Livingstone first arrived on the Shiré. His territory now, together with that of his relative Katawarra, may be said to include an area of 3000 square miles. It is bounded on the north by the Angoni country, on the east by the Shiré river, on the west by the water-shed, and on the south by a line drawn from Chiromo west. Three of the Makololo chiefs, assisted by their communication with the English and the guns and ammunition obtained from them, have succeeded in establishing one or more villages on the immediate bank of the river; but their influence has never extended more than two or three miles from its bank, and the Chikorongo people have scarcely ever been visited, and are almost unknown to the Europeans on the river. They are essentially a peaceful and domestic tribe, and, though constantly harassed by the marauding Angoni and Makololo, have succeeded in holding their homes, though not possessing the guns and weapons used against them by the so-called friends of the English. Their country offers valuable sites for extensive coffee plantations, besides which it is prolific in

most tropical products, of which cotton, indigo, cocoa, rubber, rice, and sugar may be mentioned as the most important.

Among the mountains on the westward of this country, such as Salumbidwa, are to be found vast herds of game, including elephant and buffalo, while to the north-west are signs of valuable auriferous deposits, which will prove of very great importance in accelerating the opening up of these regions. In the whole of the Loangwa basin the cultivation of coffee will offer a vast field for commercial enterprise. The quality of the coffee obtained has proved by its topping the market to be excellent, while the cheapness and quantity of labour to be obtained enables its cultivation to compete with the greatest success with any other market in the world. Considering generally the immediate future of this vast region, its well known and rich mineral wealth, its suitability for extensive agricultural enterprise, the friendliness and industry of the people, and, above all, from its high elevation, its suitableness for the colonisation and residence of Europeans, there are abundant and convincing proofs of its value to the commercial and financial world; while, over and above all these resources, it possesses a unique advantage in Africa by reason of its abundant water-supply and remarkable characteristic of having navigable communication with the seaport from almost every part. When we consider how greatly the want of cheap and rapid communication has handicapped most other interior regions of Africa, and how healthy highlands elsewhere can only be reached by fatal journeys of many miles over the most deadly swamps, it will be palpable that a country like this, possessing none of these disadvantages, has as good prospects as any other part of Africa.

After encountering a number of difficulties on the Zambesi river, our expedition succeeded in reaching the northern limit of navigation on the Lower Zambesi. Every effort was made to push on to the very furthest point possible for our boats, and it was not until our further passage was stopped by huge granite boulders and seething eddies that we turned to the shore and fixed our last river camp. Five hundred feet above a sandy cove in which our boats were moored was a huge fig-tree, and under its wide-spreading branches we pitched our tents. Our prospects for the future were not very bright. After struggling two months or more to overcome the obstacles in the waterway, the expedition now found itself stranded in a hopeless *cul-de-sac*.

The friendly river which had brought up so easily our large quantity of impedimenta no longer helped us, and we had perforce to sit down in camp surrounded by piles of merchandise, without apparently the remotest possibility of proceeding another mile on our journey.

Surrounding us were rugged, inhospitable mountain peaks. Below the camp on a sandy ridge were a few scattered huts of poverty-stricken natives. On the opposite bank a wide expanse of dazzling sand and water-worn boulders reflected burning heat in the day, and at night wafted over to us the resonant roars of the lions that inhabited its fastnesses. Beyond, piled up tier after tier, rose the highlands of the distant Makanga, whom we were led to consider, from local reports, as more ferocious and to be dreaded than our noisy leonine neighbours.

The Governor of Tete had kindly given me an official letter to the official who ruled and owned the people in the immediate vicinity of my camp, by name Jêsus Ignaçio, informing me frankly that my only chance to obtain porters from him was to put him in a state of inebriation, and that the Government itself had the greatest difficulty in treating with him. Presenting my letters to this official, I soon discovered that no assistance could be looked for from that quarter.

After a month had passed in futile waiting, matters became too serious to depend longer on his palpably mendacious promises. Food was getting short, and impatience was shown by the members of the expedition. Early one morning I got together two or three Arabs, one boy to carry a blanket, and two or three boxes of sardines, with a few biscuits, for my own use; the others carrying their own provisions, consisting of rice, for four days' journey. Leaving the remainder of my men in charge of the camp and goods, I made my way along the left and opposite bank of the river to explore the falls, and, if possible, to travel up the Luia river and obtain porters from natives who might be living there, away from Portuguese jurisdiction. No local native would render us his services, even for this small journey, from dread of the Makanga.

For two days we trudged on over burning rugged rocks, sleeping at night in the sand on the bank of the foaming river, surrounded after dark by a ring of lions. Indeed, this place is infested by more lions (some of enormous size) than I have known in any other part of Africa. Not a solitary house or human being was encountered on our route. The afternoon of the third day we came suddenly on a deserted encampment.

Leaning against the trees were packages of merchandise neatly bound up in native bark cloth; beneath them were bows and arrows. Over the smouldering fires were roasting strings of elephant meat and dried fish, but not a single native was to be seen. Peering about in the jungle to endeavour to discover the occupants of the camp, who had evidently taken fright at our approach, we at last perceived, on the summit of a precipitous crag one thousand feet above us, a number of black objects, which we at first took for baboons, but soon found were natives who appeared to be eagerly watching our movements. We tried everything to convince them of our pacific intentions, without success; they had mistaken us for an expedition of Makanga, and we had dropped on a trading caravan belonging to the Portuguese side of the river.

Half-a-mile away on the opposite and southern bank, buried amongst the rocks, was a Portuguese village, to which these traders were evidently bound. On the sand were drawn up two small canoes used as a ferry. Finishing a light meal, we left this camp and endeavoured to proceed higher up the river; after half-an-hour's walk through a picturesque park we found ourselves in a *cul-de-sac*, hemmed in on all sides by impassable walls of granite; wending our way with great difficulty up the dry bed of a mountain torrent, we at last found it was necessary to retrace our steps, and it was nearly sundown when we arrived at our former camping-place at the river bank.

We found here the terrified owners of the camp still ensconced

on the summit of the crags; their fires had gone out, and their meat and fish had fallen burnt into the embers. As our further progress on this side was impossible, it was necessary for us by some means to cross the river; we tried everything to induce the people in the opposite village to come with their canoes to ferry us over, but not one could be prevailed upon to approach within gun range.

The river at this spot formed a large and placid pool of cold blue water; a mile up and down stream it was hemmed in by walls of granite, through whose fissures it foamed and seethed. In this pool floated a number of black-looking logs; they were crocodiles. To remain in our present position, with little food in camp, meant starvation; to cross the river without a canoe was to run the gauntlet of an indefinite number of these horrid beasts. Indeed, things looked so hopeless that I did not dare to ask for volunteers. Leaving the men to themselves to talk the matter over, I went down with my rifle to the river-bank. A few minutes afterwards my interpreter and another young fellow came up to me and asked permission to attempt the passage across, which, with considerable reluctance, I gave.

The four Arabs who were with me, armed with Martinis, I placed in commanding spots along the bank, and, taking up a good position myself with my express rifle, we held ourselves in readiness to cover the swimmers during their perilous passage. These, divesting themselves of their clothes, plunged in; and their two heads were carried gradually down by the current to near the centre of the pool and the vicinity of the swarm of black logs, which, although motionless, we knew to be only waiting a favourable opportunity to seize our gallant comrades. The interpreter was ahead by a dozen yards, when suddenly between him and his companion we noticed a ripple in the water, and another black log in motion appeared on the surface. The moment was a very critical one, and from the relative positions of the swimmers and the crocodile it offered a most difficult shot. Fortunately the swimmers were apparently unaware of their terrible peril. As the crocodile approached the interpreter, he suddenly opened his huge jaws and, churning the water, prepared for his fatal rush. By this time the whole swarm, reinforced by many others who had hitherto been invisible under the surface, commenced to move in a body and dash in to get their share of the human prey. Things looked very black for the two brave swimmers: a shot from the express, however, followed almost instantaneously by the four Martinis, rendered the first crocodile *hors-de-combat*; and he had hardly sunk with a convulsive snap when, terrified by the roll of musketry which reverberated with a hundred echoes from the neighbouring rocks, the whole swarm of cowardly though ferocious brutes had disappeared below the surface, and the two black heads of the swimmers were the only objects visible. Getting now out of the current, with a few powerful strokes the two soon reached shore, when we greeted their safe arrival with a hearty cheer. The owner of the canoes had a long time fled, and in a quarter of an hour we had the satisfaction of paddling ourselves across.

Sleeping for the night in holes that we dug in the sand, next day we arrived opposite to the Luia river; but, not being able to procure a

canoe to re-cross, and provisions running very short, we turned at once to our main camp.

The object of this trip had turned out a total failure, and the difficulties of getting away seemed to me more hopeless than ever; no time, however, was to be lost. Food in the main camp was at a very low ebb, and our rations would scarcely last two weeks longer.

On the evening of my arrival I called a meeting of all members of the camp to discuss ways and means. I asked for volunteers, and every one immediately offered his services. Picking out three of the most likely Arab soldiers, I gave them instructions to be in readiness, armed and equipped with four days' provisions, to start two hours before daylight the following morning under the charge of the head Arab, Muhammad.

Muhammad, my factotum, was a man of considerable acumen and no less personal courage. The plan I had hit on, and which indeed was the only means left to us of extricating ourselves from our present predicament, was that this pioneering party should reconnoitre the apparently deserted country on the left bank. They were to follow up the dry bed of a stream we could see on the bank opposite our camp. They were to keep on for two days, and, if at the end of that time they did not meet with inhabitants, they were to return. Should they, however, encounter people of a peaceable disposition, they were to make overtures to them to come down to the bank of the river near the camp and carry up to their own country our goods and merchandise. Long before daybreak the next morning our steel boat had ferried the reconnoitring party across the river, under cover of the darkness to prevent the neighbouring villagers on our side from suspecting our movements, the Makanga country being then at war with the Portuguese Government, under whose jurisdiction we were.

The party were soon lost to view up the bed of the stream, and the boat returned.

For four days we waited without any news. Arabs were stationed all day, scanning with glasses the dazzling expanse of rocks and sand on the opposite bank for signs of their return. The fifth day passed, they had not come back, and the camp grew anxious on their account, knowing they had only four days' provisions. Fearing some accident or misfortune had happened to our party in the unknown country to the north, on the evening of the fifth day I turned up all hands for inspection: a force of twenty rifles was selected; food for four days was packed in loads to be divided amongst the men, and blankets for sleeping. Two or three men were told off to remain in charge of the camp and goods. Marching orders for the force had been given for daybreak in the morning. I had determined to accompany them to see what had become of our advance party, and, if necessary, to succour them.

Next morning all hands were ready and fully equipped, and about to embark on the boat for the other side of the river. At this moment our attention was arrested by the sharp ping of a rifle from the midst of the boulders on the opposite bank. Orders were immediately given for the men to return to camp, and a glass showed me that the firer of the

rifle was one of the Arabs belonging to the reconnoitring party. He appeared at first to be alone, but moving my glass over the sand I discerned, crouched by a rock a thousand yards away, a solitary native. Looking further up the bank where the trees edged the great expanse of sand, I saw, a quarter of a mile away, under a gigantic mimosa tree, a black mass of natives, numbering from four to five hundred, armed with guns, bows, and spears. Rightly surmising from the action of the single Arab near us that great caution should be used, I embarked on the boat, crossed the river, and sent the boat back to the other side, approaching myself, alone and unarmed, over the sand till I met the Arab.

From this Arab I learned that the party had followed up the stream for some ten miles until nightfall without encountering any signs of people or habitations; at night, however, sleeping on the summit of a hill, they saw some miles off a number of fires at the very top of a high mountain—Chuuta. The next day they continued their journey to this mountain, and three thousand feet up found themselves among native gardens, huts being visible two and three thousand feet above them. Their appearance created a great deal of alarm amongst the inhabitants, and it was with considerable difficulty that they satisfied the people of their peaceful intentions, and induced them to come down from the rocks. After some discussion two of the party were detained as hostages, and Muhammad and the remaining Arab came down to the river with five hundred carriers. Being very suspicious that it was a ruse on the part of the Portuguese to entrap them, they remained some distance away under the trees, sending down one of their party to see if I were an Englishman or a Portuguese. The native who was now scrutinising me approached with considerable hesitation and fear. Being at length satisfied, he returned to his people.

I sent over at once to the camp for my tent, chair, and cooking gear, which I pitched at some distance from the beach among the trees; the fire was lit, and preparation made for a meal. By this time the natives with Muhammad had left the tree and defiled into the little glade in which my tent was pitched, and surrounded me in a large ring, squatting on the ground with their weapons in their hands. My tactics for inspiring confidence were soon successful; the arms were left resting against the trees, and preparations made in camp for cooking and sleeping, the glade being dotted over with scores of fires. In the meantime I succeeded in getting my goods on this side of the river, and the next day our river camp was deserted. From the river to Chuuta is a fine stretch of rolling, well-wooded country, with numerous streams.

Indeed, the whole of this region is well watered. The mountains Chuuta, Zuzi, Undi, Kunguru, and several others of like formation, are magnificent piles rising from three to five thousand feet above the plateau, with precipitous walls.

After negotiations with the Makanga chief, which occupied two months, I arrived on the Revugwe at Kamsiki. My arrival was made the occasion of great public rejoicing and festivities. Several miles from the town I was met and escorted in by the chief's state band, consisting of flutes, drums, and native musical instruments, my near approach to

the kraal being heralded by an incessant firing of muskets, tootling of flutes, banging of drums, and deafening shouts and cries from a crowd of two or three thousand people. Being led into the stockade by the chief, we were regaled in the courtyard by a number of amusements lasting for several hours, which included conjuring, dancing, singing, and feats by strong men—the latter being similar to the feats performed in our own country fairs. In one of them a heavy wooden mortar used for pounding corn and rice, weighing about one hundred pounds, is placed on the stomach of a man, who is supported on two stools, and any one in the audience is invited to pound the rice or flour put in the mortar. A small wooden figure of a man is carefully placed on a mat by the performers, this figure being a kind of fetich to protect them from injury during their dangerous performance. These people come from the hill tribes, and their fetich created a great deal of amusement and ridicule amongst the higher-class Makanga sitting round.

The religion of the Makanga people is a curious mixture of native superstition and Christianity learnt years past from the Jesuits. A form of oath frequently heard means "By the Father, by the Son, and by the Mother," which bears clear evidence of Jesuitical teaching.

The Government of the Makanga country is an autocratic one, the chief being supreme judge. The penalty of death is inflicted in the case of the seduction of a married woman, murder, and sometimes in cases of theft; other crimes are punished by the sale of the offender to a passing caravan as a slave, by mutilation, flogging, or fine. In the case of most of the minor crimes, except theft, there is often an option of a fine.

Travelling eastward from the Makanga country, we passed over a rich, well-watered plain, enclosed on the north, east, and west by a higher mountainous plateau.

From Undi to the Zambesi the country is for the most part high and rugged, intersected with great rivers, affluents of the Luia, which in the wet season are only crossed with the greatest difficulty, but in the dry consist of long successions of pools swarming with crocodiles and hippopotami.

A RECENT JOURNEY IN NORTHERN KOREA.

By C. W. Campbell, H.M. Consular Service, China.

(*Read at Meeting of British Association*, 1892.)

Ten years ago Korea shared with Tibet the distinction of being one of the two least-known portions of the Eurasian continent. Though, from an explorer's point of view, as readily accessible as Japan or North China, no Western traveller, properly so considered, had been permitted to visit the interior, or to do more than land on its shores. So far as the Koreans were concerned, their action was dictated, not so much by hostility or contempt, as by fear; experience had taught them to hold all strangers as enemies, and to consider them none the less dangerous because they professed to be friendly. A strict and

inhospitable seclusion, a resolution to have as little to do with other peoples as possible, which seems to have been the main defensive policy of Far-Eastern Governments, kept us in deep ignorance of much that was likely to be interesting with regard to the actual conditions of life and nature in this very remote peninsula. The only reliable knowledge of such matters obtained at first-hand was vouchsafed to us in the introduction to M. Dallet's *Histoire de l'Eglise de Corée*, a work published in 1874. It was compiled from the letters and other writings of French missionaries who laboured secretly in Korea from the year 1836. Whatever else was known to us was drawn from Chinese and Japanese sources, mostly antiquated or obsolete, which, so far as ordinary descriptions are concerned, do not err on the side of accuracy.

The treaties concluded by the Korean Government with Western nations, in 1883 and 1884, put an end to the era of political asceticism, and threw the country open to foreign residence and research. Since then a slender stream of travellers and "globe-trotters" have done much to contribute to a better knowledge of its physical conditions. My own wanderings in Korea were not the result of any special study, but were purely accidental. As a member of the Consular Service in China, I was detached on special service to Korea in September 1887, and while stationed at the capital, Seul, I was brought to observe that considerable portions of the country were still unknown to Europeans. My predecessors in Korean exploration, Dr. Gottsche[1] and Mr. Carles,[2] had left unvisited two, from native accounts very interesting, neighbourhoods—the Keum Kang San (Diamond Mountains) in Central Korea, and the extinct volcano of Peik-tu San (White Head Mountain) which lies in the extreme north, on the Manchurian frontier. Among the Keum Kang San is clustered a collection of monasteries which constitutes the Mecca of the few Korean *bonâ fide* Buddhists, and the bold scenery of the mountains yearly attracts hundreds of native tourists. Peik-tu San, it is true, had been explored from the direction of Manchuria by Mr. James[3] and his companions in the summer of 1886; but the country on the Korean side was absolutely unknown, and merited attention. I at once projected a journey which should include these two neighbourhoods, and some two years after the inception of the project I obtained the leave necessary to put it into execution.

I set out from Seul on the 31st of August 1889, and followed the highway to Wen-san. I use the word "highway" in the absence of a better, for it is impossible to convey in a short expression the exact status of a Korean road. Over low ground it is wide and stony, or muddy, or sandy; in mounting hills, a perpetual occurrence, it dwindles into a mere track or bridle-path hardly broad enough to allow two persons to walk abreast. Eminences are skirted as far as possible, and little effort is made to keep the way reasonably direct—a large stone, a pool, or a tree, is sufficient to deflect it, and long circuits are made to reach a ford, to avoid a brook, or to turn a stretch of rice-field. When an obstruction

[1] *Verhandlungen der Gesellschaft für Erdkunde zu Berlin*, Band xiii., 1886.
[2] *Life in Corea.* London, 1888. [3] *The Long White Mountain.* London, 1888.

occurs, it is always considered easier to make a new track than to repair the old one. What in Korea is called a "good road" is soon found to be one which offers no insuperable obstacle to pack-animals, no matter how many bridgeless streams there are to ford, or rocky slopes to surmount. A good average day's journey is 80 *li*, or, say, 25 miles, which represents eight or nine hours' travelling, exclusive of halts.

A word or two about modes of progression. The European has practically no choice. His baggage is intrusted to pack-ponies standing little higher than Shetlands, which keep up a steady three-mile-an-hour pace no matter how heavy their loads; and he himself bestrides an equally tiny saddle-horse, unless he is lucky enough to secure a Chinese importation. The only alternative is a sedan borne by relays of coolies, which is the method adopted by all Koreans of rank, both because it is the most respectable and because it fatigues them least. But to an active European the sedan is monotonous and tiring, and perhaps he is disposed to attach too little importance to outward signs of respectability when travelling in the Far East.

From Seul to Keum-seng our way lay through a succession of valleys of striking fertility. The harvest being near at hand, the country was seen at its best. In low-lying portions, where water abounded, were the flourishing rice-fields; higher up soy-beans (*Glycine hispida*), kidney-beans (*Phaseolus vulgaris* and *Phaseolus radiatus*), buckwheat (*Polygonum fagopyrum*), Italian millet (*Panicum italicum*), panicle millet (*Panicum miliaceum*), and *sorghum* were luxuriant growths. The gardens attached to the peasants' cabins were taken up with plots of the subsidiary crops, such as lotus (grown for its seeds and starchy rhizomes), radish-turnip (*Raphanus sativus*), rape, brinjal, melons (*Citrullus edulis* and *Cucumis melo* amongst others), tobacco, chilli, castor-bean, hemp, and sesame. A more prosperous-looking picture could not be well conceived, and one wondered that the owners of such a land should be so poor and their abodes so wretched.

Beyond Keum-seng I turned aside from the beaten track into unknown country, which proved to be wilder, much more richly forested, and notably less cultivated. The Tan-pa Ryeng (Crop-hair Chain or Pass), over which our baggage had to be carried by porters because the ascent was too difficult for pack-animals, was crossed, and on the 6th September we reached Ch'ang An Să, the first Buddhistic establishment on the west side of the Diamond Mountains.

The passage of the Tan-pa Ryeng first brought me in contact with a prominent feature of Korean provincial government. The bearers who had been engaged to carry the baggage had done so without the usual preliminary parley as to wages; which was astonishing enough. More curious still was their conduct after they had deposited my belongings on the other side of the pass. One by one they filed off to return home without a single demand for pay or recompence, and none showed a desire to bid me the usual "Go peacefully, sir." This was entirely un-Korean, and my suspicions were aroused. I stopped everybody and held a conference. It turned out that I had been treated like a Korean magnate, chiefly because my credentials were similar to those carried by

natives of rank, and the peasants had been told off to carry my things just as they would have been called upon to do in the case of a Government official. Being the first foreigner to travel in this particular region, I attached more than ordinary importance to leaving a creditable name behind me; and as such a consideration does not much influence the actions of Korean official travellers, I took effectual steps to show the poor coolies that I was not to be classed in the same category.

The Korean system of forced labour, thus unwittingly made use of, is in constant and universal operation. It bears a resemblance to the old French *corvée*, in that it is chiefly restricted to roads and helping people over them. A Korean official travelling on public business naturally expects to do so at the public cost, but this conception of public cost is usually anybody's cost except his own; and the Government rule being that travelling expenses must be borne by the districts passed through—in other words, that a locality must provide food, lodging, money, bearers, and beasts of burden on the spur of the moment whenever it is so unlucky as to have an official visitor—it is easy to understand that the progress of such persons through the country is not always smooth. When things are done as they should be, the officer, on arrival at a prefectural or departmental town, presents his documents at the magistrate's office and requests so and so much assistance to carry him on to the next magistracy. If in haste, he sends a messenger ahead to say so, and everything is made ready to expedite his journey. Baggage-ponies are sought from the post-station, if there is one; if not, bulls or men are requisitioned (without remuneration) through the headman, rooms are swept and garnished, and money collected. Sometimes, it is said, he finds it necessary to send out his servants to seize the magistrate or treasurer, and obtain the satisfaction of his wants by threats or duress; at others, these gentlemen make themselves invisible, and leave him to work his will on the people. By hook or by crook he provides for himself. The bulls or ponies he ought to change at the next post-station, and the bearers are relieved at each village on the road (say every five *li*, or two miles)—a process involving considerable delay at the best of times. Unfortunately, he or his servants are not always satisfied with what is legally due to them. All Koreans of note are attended by a swarm of retainers, who frequently require little encouragement to rob and extort promiscuously. Worse than this, rapacious magistrates invariably make the demands of the visitor a pretext for harrying the neighbourhood. And when it is borne in mind that the business which calls the officer out on his travels often has as little connection with the people who entertain him as my journey had with the Tan-pa Ryeng villagers, nobody will be surprised to learn that there are few sights more unwelcome to the Korean peasant who lives on a frequented road than the retinue of an official.

I have dwelt at length on this subject because, to my mind, it is an apt illustration of the way in which Korea is governed. It has also a direct bearing on Europeans who may travel in this country. A foreigner is most likely to journey under the same outward conditions as the native officer—that is to say, with official passports and a large train of animals and servants—and if, as must happen, he be completely ignorant of the

Korean language and customs, the chances are that he is made the vehicle of much injustice without his being in the least aware of it.

The Diamond Mountains I found to be an exceptionally rugged portion of the chain which forms the backbone of the peninsula. Here intrusive basic rocks, principally dolerites and diabases, break through the granite, gneiss, and schists which elsewhere are the main constituents of the land surface. Few places are more celebrated in any country than these mountains are in Korea. Their fame, indeed, extends beyond Korea, but chiefly as a Buddhistic centre—the Koreans, who are not remarkable devotees of Buddhism, esteeming them solely on æsthetic grounds.

Buddhism evidently found a refuge here soon after its introduction into Korea, which Chinese and native records tell us occurred towards the end of the fourth century after Christ. The first monastery I stopped at—Ch'ang An Să, the Temple of Eternal Rest—is mentioned in an old Korean book I picked up at Seul as having been restored or rebuilt about the year A.D. 515. So far as I am aware, there is but one path across the Diamond Mountains, and that may be briefly described as seven or eight miles of extremely rough torrent, winding up the west slope to the watershed, which is 4200 feet above sea-level, and a twenty-five miles' descent of wild mountain-road on the other side. It is impracticable for baggage-animals, and ours had to be sent back a portion of the way we had come in order to turn the northern flank of the Keum Kang San by the usual trade-route. Visitors are helped in every possible way by the monks; and, thanks to them, my three days in the Diamond Mountains were spent very agreeably. To ascend the torrents, a species of mountain chair is kept at all the principal monasteries. It consists of two stout 10-feet poles lashed a couple of feet apart, with a narrow seat across the centre, which is provided with slender supports for the back, arms, and legs. The bearers are lay members whom long practice has enabled to manipulate these chairs over ugly ground with great steadiness and dexterity.

At present upwards of forty shrines, tended by 300 or 400 monks, a few nuns, and a host of lay servitors, are scattered over the east and west slopes of the Diamond Mountains. The great majority of the monks are congregated at the four chief monasteries, and the nuns possess a small sanctuary or two, where they find sufficient to do, apart from religious exercises, in weaving cotton and hempen garments and in other womanly occupations. The monks, when not in residence at the monasteries, travel all over the country, alms-bowl in hand, chanting the canons of Buddha from door to door, soliciting subscriptions for the building of a new altar or for the repair of an old one, and begging from day to day the food and resting-place which are rarely denied them.

I cannot say much for these exponents of Buddhism. Few of them know much of the religion or its history, and none could attempt to explain intelligibly the purport of the books they use at their services. These are carried through in the most perfunctory style, and with an utter absence of true devotion. The shrines are not lacking in the impressiveness characteristic of holy places; but the debased existence, in most instances, led in monasteries is a constant topic among Koreans. The Buddhist monk, in their estimation, is a very low creature, whose

morals are no better than his neighbour's, and whose life is usually the reverse of the pattern it ought to be.

Crossing the Diamond Mountains, we took a north-westerly course and followed the coast-line to Wen-san, the Eastern treaty port. At Tong-ch'en I was brought face to face with one of the difficulties which beset travellers in out-of-the-way parts of Korea. Beyond a radius of 60 or 70 miles from the capital there is only one current coin, a brass "cash," of which some 4000 go to the £1 sterling. Silver is absolutely useless, except in the largest provincial cities. In travelling, of course, the weight and bulk of these coins make a large stock impossible, and the periodical replenishment of the purse, therefore, becomes a matter of serious importance. The supply I had started with was more than ample under ordinary circumstances to carry me to Wen-san, but I had not bargained with the Buddhists. Instead of staying at one monastery, as originally intended, I visited four, and the donations which etiquette required me to give to each ran me very short. To provide for eventualities of this sort I had armed myself with a letter from the President of the Korean Foreign Office, which recommended me to the care of the officials of the districts I might pass through, and directed them to furnish me with whatsoever I wanted in food, transport, or money. In payment I was to give my note-of-hand redeemable at H.M. Consulate-General in Seul. You might suppose that such a document would invite respect. I can safely say that it was never produced without causing explosions of wrath and exhibitions of the choicest language. On its authority I made an application for a small loan—something like £2, 10s.—at the Tong-ch'en magistracy. I struck the place, however, at an unfortunate time. A week before the people had risen against their prefect because of his extortions, and driven him out of the country. The clerk who fulfilled his functions responded to my modest demand by sending exactly half of what I had asked for. I inquired, through my servant, the reason of the reduction. He was told with exceeding heat that I ought to consider myself lucky to get what I did. The clerk didn't know me from Adam, and couldn't conceive my object in flying about the country borrowing money on the strength of a Foreign Office despatch. It was true the despatch said I would pay everything back through some Foreign Office at Seul, but he had never heard of this Foreign Office, and didn't believe it would honour my drafts anyway. There was a good deal in what the man said—so much so that I refused to have anything to say to his money. The Foreign Office was a new creation arising out of foreign treaties, and likely to be unknown to local officials in remote districts. Unfortunately for me, the only strangers who had preceded me in this district—two Japanese merchants—had gone off leaving behind them obligations to the extent of 15s., which they had forgotten to redeem, and the inhabitants were under the strong impression that I was quite capable of following their evil example. Nevertheless, I wanted money, so next day, at Hyek-kek, I again tried the effect of the Foreign Office letter, with much the same result. However, the assistant-magistrate screwed up courage to lend me 30s.—an effort which, he said, exhausted the local treasury—on condi-

tion that I repaid it at Wen-san instead of at Seul, and defrayed the expenses to and fro of the messenger he sent with me. This transaction pointed to the interesting conclusion that there was a much greater lack of confidence in the Korean Foreign Office than in a complete stranger like myself.

That the country traversed in this roundabout journey of 250 miles is not populous, is a conclusion arrived at without hesitation, though I should be at a loss to convey my impressions on the point in figures. Hamlets of a dozen or twenty houses are numerous in the cultivated valleys, but on the whole road from Seul to Wen-san I did not pass a dozen places of 200 houses, or, say, 1000 inhabitants. Of course, it would be unsafe to form any general opinion from this. The south of Korea is reputed to be twice as thickly populated as the north, and the occasional presence of South Korean immigrants in the northern provinces tends to prove an overplus somewhere.

The main industry is agriculture. The villages are of two distinct types: the purely agricultural, which lies away from the beaten track; and that which depends as much on the entertainment of travellers as on farming. Any wayside *étape* furnishes an example of the latter kind. The road enters between two higgledy-piggledy lines of low, mud-walled, straw-thatched hovels, thrown up at random, without convenience or effect. Heaps of refuse, open sewers, offensive pools, obtrusive stacks of fuel, nude children disporting themselves, and occasionally a crowd of disputants, all combine to make it an indifferent thoroughfare.

Most of the houses are inns or eating-shops. The main gate of the inn leads directly from the street into a quadrangle bounded on two sides by open sheds, which are provided with troughs for the feeding of pack-animals, and on the other two sides by the guest-rooms and kitchen. The courtyard is untidy, often dominated by a powerful pig-stye, and littered with fodder or earthenware pitchers and vats, the contents of which are usually the strong-smelling pickled cabbages and turnips so dear to Korean stomachs. I never had the courage to examine the kitchen closely. My food was cooked in the open air over a charcoal brazier, and in my own utensils. One's room in an inn, I am thankful to say, is very simply furnished with a reed mat spread over the mud floor. Even with this slight cover the numbers and virulence of the vermin at times exceeded my wildest expectations.

The site of the agricultural village is a hill-slope facing the south. Over this the ordinary hovels, each standing in its own patch of garden, which is protected by a neat fence of interlaced stems, are scattered at random, and there is not much attempt at a street anywhere. Every house has its threshing-floor of beaten clay, the workshop of the family. The stream which runs past the foot of the hill, or courses down a gulley in its side, is lined with women and girls washing clothes with sticks instead of soap, preparing cabbages for pickle, or steeping hemp. Seen from a distance, these places are quite picturesque. The uneven terraces of thatch are brightened by the foliage and flowers of gourds and melons which climb all over the huts. In the gardens surrounding each house

are plots of red chilli, rows of castor-oil plants, and fruit-trees, such as peach, apricot, pear, and persimmon.

A week's journey along the coast brought us through Ham-heung to Puk-cheng. This district was populous, and fairs were quite common. Every other day the road was animated with a concourse of merry, brightly-dressed people wending their way to the market-town; squads of women carrying jars and baskets of melons, pears, chillies, etc., on their heads and babies on their backs; bulls and carts laden with brush-wood for fuel; produce of all kinds, including grain and dried fish, borne by ponies and men; sturdy, half-nude coolies perspiring under lofty wooden frameworks, to which assortments of earthenware pots and turned wooden dishes were attached; and, more numerous than all, the pleasure-seeker or *ku-kyeng-kun*, in holiday dress, strutting along in company with a batch of friends, gesticulating, laughing, and cracking jokes productive of the most hilarious mirth. Such throngs greeted the foreigner with amused surprise, sometimes a trifle rudely, but always good-naturedly. The women in most cases behaved as properly conducted Korean women ought to do when their faces run the risk of being scanned by a stranger, and turned their backs on him; yet frequently all scruples vanished before an overpowering, and no doubt feminine, curiosity to take in the particulars of so odd a costume, or to discuss the singularity of the equipage.

The main street of the town or village is the market-place. It often widens into a sort of *place* or square, where straw booths are hastily erected for the occasion; but ordinarily each man exposes his wares on some boards, or on a cloth spread on the ground in the best spot available. The articles for sale are of the simplest: fruit, such as melons, peaches, apricots, and nectarines; tobacco in long, wrinkled, unpressed leaves; fresh salmon and dried fish; barley, rice of many qualities, beans, and pulse exposed in trays of straw matting, or packed in straw bags; charcoal in tiny bundles at a *cash* each; cast-iron pots and boilers, whose only merit is cheapness; wicker-ware in the shape of neat baskets, trays, and panniers; silver rings, hair-pins, and other trinkets of no particular excellence; straw sandals and hempen shoes; and hats in a variety of shapes which defy a short description.

Foreign goods are exposed in booths six or eight feet square. The walls of these diminutive establishments are draped with grey shirtings, Victoria lawns, and cheap towels, mingled with native cottons and grass-cloth. The proprietor squats Turkish fashion on the boarded floor; and around him, within easy reach, is a miscellaneous collection of needles, Japanese matches, mirrors, Prussian blue in card boxes and aniline dyes in bottles, cheap knives, santonin lozenges (these, the dyes and needles are of German origin), ribbons and braid, brass pipe-bowls and mouth-pieces of native make, and long cane stems for pipes. A sign of the advancing times is occasionally seen in cigarettes and lacquered holders of Japanese manufacture, and cheap foreign soaps. A bale or two of Manchester goods completes a stock which might be bought outright for £2 or £3.

From Puk-Cheng we struck inland on the 23rd September, and next

day surmounted the Hu-ch'i Pass (4300 feet). Thence to the Yalu the character of the country was completely novel. We had left warm, low-lying valleys producing rice and cotton, and had entered a plateau-like region averaging 2500 feet above sea-level, where these crops were impossible, their places being taken by oats, millet, and hemp. On the sea-coast it was still summer, yet twenty or thirty miles inland severe frost had blanched the tops of the trees and converted the bright green turf and shrubbery into withered brown expanses of wearying tameness. The houses were log-huts, plastered with clay and roofed with thatch or shingle. The population was very sparse. Game, chiefly pheasants and deer, were plentiful. Tigers were reported to be common, and not a few of them were man-eaters.

By the end of September I had found my way to Po-ch'en, the most northerly point in this direction at which a Korean official is stationed. Here at last I met a man, a combination of hunter and farmer, who had ascended Peik-tu San and seen the lake on its summit. This was comforting, for all along my route, hitherto, I had heard nothing definite about the mountain except that it was next to impossible to reach it. Under this man's guidance I made dispositions for the journey. My baggage was cut down to the finest proportions, and resolved itself into a blanket, a change of clothes and foot-gear, Liebig's extract, hard biscuits, a flask of brandy, medicines, a rifle shot-gun and cartridges, pocket aneroid, watch, compass, photographic apparatus, and boiling-point thermometers. Four bearers—two were guides who professed to know every path in the Peik-tu San forests—carried these and a supply of millet sufficient to last the six Koreans of the party for three weeks.

At ordinary times, say from May to September, the expedition would only take ten or twelve days; but October was too late for easy exploration in this neighbourhood, and precautions had to be taken against snow, which, it was declared, fell so heavily as to make travelling impossible for days together. The journey can only be made on foot, though ponies and bulls are employed by the sable-hunters—speed is scarcely an object to them—to carry small, compact loads to the different hunting-lodges.

I succeeded in starting from Po-ch'en at noon on the 1st October, but only to stop two miles further on. One of the bearers repented at the last moment and found a substitute, and the guides laid in a stock of clean white rice, a rarity in these backwoods, which was done up in small paper parcels of an ounce or two, for sacrificial purposes. The utmost care was taken of these rice offerings. I was disposed at first to look on them as part of a perfunctory performance carried out for form's sake; but the consternation which once seized the whole party, including one of my Seul servants, at their supposed loss, was too genuine to permit a doubt of the true feelings of the Koreans in the matter.

We soon struck into the dense forest of fir, pine, larch, oak, and poplar which extends, with few intervals of open ground, all the way to the White Mountain. We followed the tortuous paths taken by the hunters in search of deer and sable. Occasionally we encountered dense thickets and spongy marshes, but as a rule our path was obstructed only by tree-trunks, and was very pleasant walking. Twenty miles north of Po-ch'en

we passed the last settler's hut, and for the week following we were dependent for shelter on hunters' lodges whose owners had deserted them for the winter. Hitherto I had been very fortunate in my weather. The small proportion of four or five rainy days out of thirty odd had almost led me to leave the elements out of my calculations. Now, however, that success or failure was merely a question of weather, the tables were summarily turned against me. The first snow of the season had fallen a week previously, and the hunters thought that, if we reached Peik-tu San before a fresh fall occurred, the ascent of the mountain might be accomplished without difficulty. On this slender chance our hopes rested. During the third day in the forest rain and sleet occurred intermittently, but on the fourth snow fell so thickly and continuously that more than once I felt tempted to heed the warnings of the Koreans and turn back. On the afternoon of the 5th October we forded the Yalu, crossing into Chinese Manchuria, and had just taken refuge from the blinding storm in a broken-down hut, when, by a curious coincidence, the owner of the place, a Korean sable-trapper, appeared on the scene with three companions and two ponies laden with provisions and hunting-gear. After some parleying, this man, who really did seem to know these parts well, agreed to show us a short cut to Peik-tu San which would save us a good day's journey. Next morning, then, he led us northward along the Manchurian side of the Yalu, over ground so difficult that we were sometimes forced to descend to the water's edge and climb over the boulders. Two hours of this brought us to the junction of the two streams which here form the Yalu; and, following the western and smaller one to its source, we ascended rapidly into an open valley covered with deep snow.

Our volunteer guide soon got tired of the snow; for that matter, so did we. Reaching a point whence the view for three miles before us was unrestricted, he showed us a depression in the range in front which we had to make for, and explained to my guides how we should proceed afterwards. I was loth to part with the man, but nothing I could offer him would induce him to go a step further with us. However, my original guides were satisfied they knew all that was necessary, and we toiled on, myself, the lightest-burthened, in advance, the others taking advantage of my footsteps in the snow in following. We camped for tiffin—always a long business with the Koreans, who had to boil and wash their millet—below the Tei-mun Ryeng, the depression mentioned before, and it was fully three o'clock before we succeeded in surmounting the ridge (6200 feet above sea-level). Just opposite, on the north and north-east, was the White-Head Mountain. The day had cleared wonderfully; the clouds, which rarely desert the summit, possibly because of the lake, had disappeared; and we got our one good look at this hoary ancestor of the Ch'ang-pai Shan. The near view was not striking; a short four miles as the crow flies separated us from the crest. We were scarcely more than 2000 feet below the level of the jagged peaks that mark the position of the lake, so that the massiveness of the mountain is not apparent from a distance.

There was no time to waste. The snow was a foot and a half deep, and some six miles of unknown country still remained to be traversed

before nightfall. Blazed trees and broken twigs showed us the way down the valley, across a feeder of the Sungari—according to the Koreans, the Tei-mun range divided the Yalu from the Sungari basin—and on up to a hunter's hut, the last occupant of which, I afterwards learnt, had been devoured by a tiger during the winter of 1888. The place was *funeste*, and no one tarried. The guides were now thoroughly at fault. Our destination, a hut some 1000 feet or so below the summit of Peik-tu San, could hardly have been more than two or three miles away, and, though the snow was getting deep, the slope was pretty easy and gradual. After some delay the oldest guide discovered a torrent he knew, or said he knew, and forthwith led us up it. By this time we had passed beyond the zone of dark-foliaged fir and pine into one of bare-branched larch or spruce, which covers the upper regions of the mountains.

We kept on ascending for two hours, always in the hope of crossing a trail, when, finally, the oldest guide—in fact, the only one who could pretend to know the neighbourhood—fell in a fit. I tried to revive him with brandy, but all my efforts seemed to increase the violent paroxysms that shook him from head to foot. While rolling in agony and almost speechless, he still contrived to say something that caused the bearers to deposit their loads in a twinkling; several hands seized his pouch, produced therefrom a packet or two of rice neatly tied up in white paper, and one man threw the grain towards the four quarters, while the rest invoked the *San-sin* or mountain genii. We were all too exhausted to think of carrying the poor man on, even if the way were known to us—the other guide was useless as such—so there was nothing for it but to camp where we were. It did not take the Koreans long to fell half-a-dozen trees and build a huge fire, around which we huddled, sticking our feet into the blaze to keep them from freezing. The Koreans slept, drenched as they were. As for myself, the novelty of the experience forbade sleep, and I passed most of my time dosing my patient[1] with Liebig's extract, for want of any better remedy. Occasionally the other men would rise and offer propitiatory sacrifices of rice to the offended *San-sin*. By morning the man had recovered somewhat, but the rest of the party joined with him in objecting to any further advance, and though I might have overcome their opposition, I felt that I was subjecting them to considerable risks by delaying in such a remote place, at such a season, with only a week or ten days' food in store. We returned to Po-ch'en pretty much the same way as we came. I may mention that the hut I should have reached but for the guide's misfortune was the T'ang-shan, where Messrs. James, Fulford, and Younghusband stayed during their visit to the mountain in 1886.

Peik-tu San, or Lao-pai Shan (Old White Mountain), as it is at present called by the Chinese of Manchuria, is the most remarkable mountain, naturally and historically, in this part of Asia. The perennial whiteness of its crest, now known to be caused by pumice, when not by snow, made the peoples that beheld it from the plains of Manchuria give

[1] I was afterwards told by a medical man that the symptoms indicated hysteria brought on by over-exertion; this guide was the weakest member of the party.

it names whose meanings have survived in the Chinese *Ch'ang-pai Shan*, or Ever-White Mountain. This designation, obviously assigned to the White Mountain alone, has been extended to the whole range without apparent reason, for no other peak of it, so far as is known, can pretend to perpetual whiteness, whether of pumice or snow. Some 100 miles south-east of Peik-tu San there is a Ch'ang-peik San (Ever-White Mountain) which must approach, if it does not exceed, the White Mountain in height; but the Koreans do not credit it with a snowy covering for more than nine months of the year, and a European traveller who has seen it informs me that it is wooded to the summit, quite unlike Peik-tu San, which is bare of forest for the last 1000 feet of its height. The great point of interest in the mountain, apart from its whiteness, is the lake—twelve miles in circuit according to Mr. James and his party, the only Europeans who have seen it—which lies in the broad top of the mountain at a height of 7500 feet above sea-level, and is supposed to be the source of the three rivers Yalu, Tumen, and Sungari. The *Tei Tei-ki* (Great Lake), as the Koreans call it, is the nucleus of a mass of legend and fable. It is a sacred spot, the abode of beings supernatural, and not to be profaned by mortal eye with impunity. Curiously enough, neither Chinese nor Koreans have the faintest notion of the real character of Peik-tu San. The Chinese say that the lake is an 'eye of the sea;' and the Koreans tell you that the rock of which the mountain is composed floats in water; for lumps of pumice are certainly common on the Yalu at Hyeisan. My crude geological explanations, that this *cho-san* (ancestral mountain) of Korea was a burnt-out volcano, whose crater had been filled with water by springs, were listened to with polite wonder and met with much less credence than they deserved. I pointed to the black dust, to the clinkers, and to the rocks lining the banks of the Yalu for miles, many of which looked as if they had been freshly ejected from some subterranean furnace; but to no purpose. If the occurrences I spoke of had taken place they must have been handed down by tradition, and it was useless to cite lapse of time—Koreans are ignorant of geological periods—to people whose history extends as far back as 4000 years ago.

The return journey from the Yalu to Seul does not call for much description. I first travelled westward to Sam-su with the intention of crossing the mountains to Cha-seng, or of descending the Yalu itself from Hu-chu. Want of baggage transport made the first design impossible, and shallows or rapids above Mao-erh-shan, which is really the highest navigable point on the river, prevented the second. I then returned to Kap-san to hire ponies for a journey to Chang-chin, and thence to P'eng-yang. Unfortunately, I was attacked outside Kap-san by an unruly mob of roystering Koreans while I was trying to rescue my servant from their clutches. The local magistrates helped me to arrest my principal assailants, and promised to send them to the governor of the province for punishment. I strongly suspected that he would let these ruffians off as soon as my back was turned—a suspicion shared by my followers, who told me that he was a very timid sort of official; and to make certain that this should not occur I felt it my duty to return to Ham-heung, the capital of the province. Here I saw the governor, whom I had known as Minister of

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Foreign Affairs at Seul, and from him received assurances that he would deal severely with the Kap-san rowdies. In fact, I learned afterwards that heavy punishments were inflicted on three of the ringleaders. I confess that it went sorely against my will to deviate from my journey and take all this trouble over the matter; but I owed some consideration to future travellers, who might be treated as I was, unless strong measures were taken to show the people that foreigners were not to be ill-used with impunity.

From Ham-heung we struck across the peninsula westward to P'eng-yang. Two days were spent in recrossing the mountain axis of Korea. These mountains were bare of large timber, being for the most part covered with stunted oaks and chestnuts. Until we joined the Wen-san-P'eng-yang highway there was little or no traffic or cultivation. From Orikei, however, to P'eng-yang the traffic was brisk and continuous; long lines of pack-ponies going westward, laden with Manchester shirtings and seaweed, were met by small consignments of tobacco and cow-hides bound for Wen-san.

A rapid six days' journey from P'eng-yang southward brought me to Seul and the termination of my travels. During my absence of sixty-eight days I had covered over 1300 miles, a good part of which was virgin ground.

ANCIENT IMAUS, OR BAM-I-DUNIA,

AND THE WAY TO SERICA.

By Robert Michell,

Member of the Imperial Russian Geographical Society.

(*With a Map.*)

Such is the appellation given in Oriental Asia to the great table-land which, lying between 72° 40′ and 75° 20′ E. long. from Greenwich, and say 37° and 39° 40′ N. lat., divides Inner Asia into Eastern and Western Turkestan. This elevated tract, embracing an area of about 37,000 square miles, links the four mountain systems of the Hindu-Kush, the Himalayas, the Kuen-Lun,[1] and the Thian-shan; and long before the Christian era it was considered by the Chinese, as they consider it still, to be a continuation of the Kuen-Lun (Tsung-Ling or Onion) mountains.

It is supposed in very remote ages to have divided the Aryan from the Turanian stock. From a period, several centuries before the birth of

[1] In the *Journal of the Imperial Russian Geographical Society* for 1849 the Russian Sinologist, Father Hyacinthe, showed conclusively that the proper name for this range was Tsung-Ling. The present name has its origin in a very ancient and fabulous Chinese source, and is applied to a solitary mountain, the supposed fountain-head of the Yellow River. The error was rectified in the second century B.C., and the Chinese reverted to the correct name. But it attaches more strictly to the meridional range west of Kashgar. The late Colonel Yule acknowledged that *Tsung-Ling* should be adopted, and the late M. Severtsof strove to introduce the name, but without success.

Christ to our own days, this tableland has formed a political as well as an ethnographical barrier between the Mongol Tartar of the East and the Uzbeg Turk of the West. The Kara Kirghiz nomads are the link between these two races, and they are not to be confounded with the pastoral Kirghiz *Kaisaks* of the plains which extend from the Altai mountains to the Volga river and the Caspian Sea, and down south to the Oxus between Khiva and Bokhara.

The Bam-i-Dunia, as revealed to geography within the last nineteen years, comprises a series of *Pamirs* or grassy uplands. It was the *Imaus* of Herodotus, beyond which to him "all was desert and unexplored."

Although the Greeks under the Macedonian Alexander set up a kingdom, B.C. 330, formed of a cluster of principalities on the south-western slopes of *Imaus*, they left no record of a track across *Imaus*.

However grand his enterprise in that quarter of the globe, Alexander's conquests there were short-lived, and with Seleucus, who inherited the Scythian portion of the conqueror's vast dominions, Bactria rapidly sank into barbarism and decay. The manhood of the Greeks—probably a mere handful of pure Hellenes had held Bactria originally—soon succumbed under the influences of surrounding native swarms of hardy mountaineers, and all that was Greek must have become locally absorbed in one or two generations. Bactria was a *cul-de-sac*, and, failing reinforcements from the West, the Greeks were doomed to extinction under the constant and heavy pressure of *Sacæ* and others.

On the death of Alexander, and on the collapse of his empire, Bactria found herself completely isolated; banishment to Bactria soon emphasised the estrangement; and how hard pressed the Greeks were when thrown on their own resources in that region may be judged by the stubborn resistance which was offered there to Alexander, who, while able in a single campaign to conquer India, was obliged to fight three years under the northern declivities of the Hindu-Kush ere he could consolidate his conquests on the Upper Oxus.

The Seleucidæ faded from memory, preserved only in the tradition of a descent to the lines of governors who succeeded them; and neither Ptolemy, nor even Strabo and Pliny, could draw any information on the region in question from any living sources.

The Eratosthenes system of geography must have included but a small portion of the materials which were doubtless collected by Alexander's captains; and, seeing that, according to Chinese records, the Middle Kingdom did not enter into any relations with the western half of Inner Asia before very near the close of the second century B.C., that is, when Bactria was already lost sight of to Roman history—relations which were closed again at the beginning of the Christian era—the sources of Græco-Roman information had run dry. Strabo accordingly throws no light either on *Imaus*, or on the tract of country between *Imaus* and China which Rennell regarded as the Serica of Ptolemy; whilst of Pliny, who makes mention of a commerce between Sogdiana and Sinæ (we may here note the absence of any allusion to direct Bactrian relations with the Celestial Empire), it has been said that he "seems to have known nothing of the nature of silk." Gibbon observed that even the "Romans

did not entertain a suspicion that the Seres or Sinæ" (here, too, we will take note of the assumption that the *Seres* and the *Sinæ* were identical) "possessed an empire not inferior to their own;" and Pliny, the naturalist, finding it difficult to evolve anything out of the chaos of *Serica*, sums up with "*nec in aliâ parte major auctorum inconstantia.*"

Neither Greece nor Rome, then, left any but very vague indications of a track eastwards across *Imaus*. Whatever may have been the lines of communication with the countries beyond *Imaus*, they were all, as we learn, jealously guarded by the Persians; and so difficult of access was China by land, that Justinian was obliged to employ two Nestorian monks of Persia to bring him some eggs of the silkworm smuggled in a hollow cane.

Though involving an anachronism, it may be said that no European Benedick up to mediæval times undertook to fetch anything "from the furthest inch of Asia," much less "to bring the length of Prester John's foot," or "fetch a hair off the Great Cham's beard." [1]

We are, on the strength of this, justified in assuming that *Imaus* was to all intents and purposes a perfect barrier. As Buddhism passed Chinawards through Kashmir and Tibet in the south, so it would appear that Mohammedanism followed a course through Sogdiana, striking the line of irruption of the Mongols by the Issyk-Kul on the north-east, and finding a lodgment, not, be it observed, at the south-eastern extremity of Gobi, but north of China, over against Manchuria. In a smaller and a divergent stream the teaching of the Prophet penetrated also into Eastern Turkestan by way of Ferghana.

We learn indeed, as above noted, that they were Sogdian caravans, not Bactrian, which passed in ancient times from Western Turkestan to China, where they were received as suppliant embassies of tributary kingdoms—that is, caravans following the northern route, which does not touch upon the Bam-i-Dunia. They passed from Maracanda through Cyropolis (Khodjend) by the *Casii Montes*,[2] and through the country of the Issedones. But even this is referable to a period not long before the Christian era.

According to this, the nomenclature applying to peoples and countries beyond *Imaus* must have reached our ancient geographical authorities from along this northern line of traffic—the direction in which the arms of Cyrus, as of Alexander, and of the Arabs later, were pushed on, reaching the invulnerable fastnesses of the western declivities of the Roof of the World. From along this line of traffic came to the Romans the name of the mountains frowning over the *Casii*, and from the same direction did the Greeks and Romans learn the name of a people, the *Seres*, whom they took to be the same as the *Sinæ* or Chinese. And yet, as we shall presently see, Ptolemy must have had a shrewd suspicion, from such knowledge as he was able to glean, that *Serica* and *Sinæ* lay apart from

[1] *Much Ado about Nothing*, Act ii. Sc. 1.

[2] All this indicates a northern route. The Casii Montes, according to Ptolemy's understanding, were a latitudinal range—the Altai—and the tracing of his route along the 40th parallel running to Sera shows his inclination to the belief which I hold.

each other,[1] prevalent as was in Rome the notion that Serica was the maritime *Sinæ* of the Periplus.

The identification of Casia with Kashgar was ventured by Erskine.[2] It is curious to note, however, that, according to Chinese annals,[3] Kashgar under its present name became known only in the thirteenth century. A Kasha or Kiasha is mentioned in very early records, but that seems to have been the Kasha (Kucha) of Goës. Curiously enough, the first circumstantial information concerning Kasha or Kashgar is found only in Chinese annals of 36 B.C. I say curiously, because the western provinces were opened up by the Chinese in or about 100 B.C. This territory was during the Han dynasty known by the name of *Sulé*, but it was only at the late period given above that the statement was made, that "a high road passed through Kashgar westwards to Davan (Ferghana or Kokand), to Kangui (region of the steppes north of the Jaxartes), and to the great Yue-chi (residence Khiva) territory between the Oxus and Jaxartes and Kokand.[4]

But Chang-Kiang, the Chinese envoy and traveller, B.C. 127, makes no mention of Sulé, and, having been detained in the capital of the Hun sovereign, who caused him to be married to a Hun woman, he travelled by a northern route for "several tens of days" until he reached Davan.

"Davan," Chang-Kiang wrote, "lies to the west of the Huns," meaning from the seat of their power, "and almost 10,000 *li* direct west from the capital" (the then capital of China—Shen-si). The residence of the great Modi or Modo, as of the successor of that Hun chief, was at that period on the Orkhon, where Goës, Marco Polo, and others found the Mongol successor of Jenghiz.

The object of the mission upon which Chang-Kiang was despatched was the arrangement of a combination of the forces of the West against the formidable Huns. The great Modi had anticipated such a contingency—although the mission was ultimately crowned with success; he had driven the Yue-chi into the west; his son had followed up that people, and, vanquishing them, had put to death their leader, converting his skull into a lacquered drinking-bowl. His grandson maintained the ascendancy of the Huns in Inner Asia by conquering Dahia or Cabulistan.[5] There does not appear to be any evidence whatever of a commerce with China passing over *Imaus* and through Kashgaria. We do find, on the other hand, that while the populations of Inner Asia, both west and east of *Imaus*, were seething in commotion, flying in every direction from ruthless ravagers at every period upon which any light is thrown by history, there was a way to China by the "Thousand Springs" and the valley of the Ili river, and consequently by the head waters of the Selenga and Orkhon, where in all probability, as I will proceed to show, was the emporium of the commerce, if such a term as

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[1] *Vide* Ptolemy's *Oriens Secundum*, as mapped by him.

[2] Leyden's *Memoirs of Baber*, p. 18.

[3] Father Hyacinthe's *Materials as to Populations of Central Asia in Ancient Times*, part iii. p. 37 (in Russian).

[4] Father Hyacinthe.

[5] Instead of this I would suggest Bactria.

emporium can be applied to the extreme end of a spasmodic traffic from point to point along that line of principalities. It was the direction in which others, even long after Chang-Kiang, travelled from the west to the seat of the "Great Cham," the first authentic journey being that of the Russian tributary princes of Novogorod.

There are many good and strong reasons for identifying the seat of the Hun sovereignty in Northern Mongolia with the *Statio Mercatorum* of the Romans. The foundations for the constructive argument in favour of Tash-Kurgan as the *Statio* are by no means sound or reliable;[1] and, admitting that my researches in this matter do not extend into Chinese archives, except through the medium of known translations, I have not found any confirmation of such argument in Chinese authorities.

The contention of the late M. Severtsof that Kashgar corresponded to the *Statio Mercatorum* is to my mind more reasonable; but, even to this, the very great objection may be made that the Chinese have not chronicled any particular relations with that region—even during the hundred years when their influence extended to the shores of the Caspian.

In the days of the ancient Greeks and Romans the Emperors of China had little or no acquaintance with the region of the basin of the Lob-Nor, and during the period extending from before the days of Alexander's Bactria to well into the Christian era all their best energies were expended in self-preservation, and in curbing the Mongols of Northern Tibet and others.

Davan was at the same time a great goal of Chinese aims, and the destination of successive Chinese missions after 121 B.C. The Son of the Skies acquired a longing for the famous horses of that country, and the Davanis developed a craving for Chinese commodities. But the missions followed a track, passing through the country of the Usuns, north of the Celestial Mountains, avoiding that of the Huns, and leading from the country of the Usuns direct to Davan, which was so favourably reported on by Chang-Kiang, without recording any traverse through Sulé or Kashgaria.

The western regions in Asia were opened to China through the exertions of Chang-Kiang, and yet Kashgar remained very little known to the Chinese even for ages after his time.

We read, for example, in the histories of succeeding dynasties, from the second century B.C. to A.D. 700, a repetition of the same old records:—"Organised troops 2000," "seat of government *Kiasha*" or "*Kasha*," and other expressions showing an ignorance on every salient point. The history of the Elder Han dynasty does, as already shown, make mention of a high road from Sulé to Davan, and in A.D. 73 the population—which a little earlier had been said to consist of only 1510 families—was said to have increased to 21,000, and the "organised troops" to 30,000; yet we read in the annals of the northern dynasties, under date A.D. 430, such fabulous statements as that "all the inhabitants of Kashgar have six fingers on each hand and six toes on each foot; children born without this number of fingers and toes are not reared." The river of Kashgaria

[1] We were informed, for example, by Valikhanof, that Tash-Kurgan was *founded* by the Kokandians "a little later" than 1832 (Michell's *Russ. in Central Asia*, p. 216). This deserves verification.

was supposed even so late to be the Yellow River. Under date A.D. 609 the historian of the Sui dynasty repeats this fable and all the other particulars previously recorded. It is true that the regions of the west, with Kashgaria, fell away from China in or about A.D. 15; but is it possible that the Chinese could have had any other than a hearsay acquaintance with Sulé, seeing what they believed of its six-fingered inhabitants in subsequent ages?

The first mention of an embassy from Sulé to China occurs A.D. 127. In the year 436 the ruler sends tribute to the Dulgas, and in 465 it is recorded that "he sent an ambassador to the Chinese Emperor bearing a '*Shahmonis*,' a priestly vestment," which was about twenty feet in length. From 635 to 728 A.D. we find it stated that "the ruler is styled Pei, and commonly called Amachji; residence Gashi (a corrupt form of Kiasha or Kasha) . . . the people worship an evil terrestrial spirit. In the ninth year of the reign of Chen-huan (639) the ruler sent an embassy to the court with five horses, and four years later he offered tribute of local production."[1] And this is all that is recorded in early Chinese dynastic histories of communications between China and Kashgaria or *Sulé*.

I cannot, therefore, discover any justifiable grounds, except they be purely geographical, for the contentions of the late M. Severtsof that the *Statio Mercatorum* was in all probability Kashgar. At the same time, little competent as I may be to vie in opinion and conclusions with so high an authority as the late Colonel Yule, it seems to me not unlikely that, if there was anywhere on a route to China a trade emporium, it was on or near the Orkhon, and, if there was a continuous line of overland traffic with China, it was intercepted there,[2] and from there passed, not to a point where subsequently admission into China was gained through a gateway in the Great Wall, but into Manchuria by easy routes, recently explored by several Russian travellers, some of which have been described by Father Palladius of the Russo-Chinese Mission.[3] It is not my intention to insist on this point, or to follow up these routes, on the present occasion.

Measuring by the commercial standard of our own or of comparatively modern times, it has been more strongly assumed than proved to demonstration that there was in the long past a stream of commerce flowing continuously to and from the far East through Asia. That this was so may reasonably be doubted. The several potentates in Asia were, as they have always been, and still are in our own days, at the head of all mercantile operations in their midst. At intervals they exchanged commodities, sending envoys to their several neighbours, presenting and receiving the worthiest productions of their respective countries. The Amir of Bokhara represents in himself an example. M. Krestofski, who accompanied Prince Wittgenstein on a mission to Bokhara in the year 1882, the object of which was to incline the Amir to allow the establishment of a line of telegraph through his dominions, gives an illustration[4] of the development of trade in Central Asia from

[1] Father Hyacinthe, part iii., pages 62, 128, 162, 186, 200, 224, etc.

[2] Ptolemy's own notion, at *Sera*.

[3] *Journal Russ. Geogr. Socy.*, vol. xxii. No. 1, 1892.

[4] *Russian Messenger*, February 1884.

the palatial germ. Bales of goods are presented to the envoy and his suite at their leave-taking. Immediately after, those of the articles with which the envoys do not find it convenient or desirable to burden themselves are bid for and purchased, by traders summoned by *Mehtars* and others of the court, at something far below cost price. The choicest wares and manufactures are thus exported, and the local traders re-sell what is retained at a large profit to their own ruler, who by this means replenishes his stock for the occasion of another visit. Nowadays the circumstances are only slightly different, and in remote ages, when there was a great variety of petty semi-independent princes, this method of barter, based on reciprocity, truly represented the trade, which yielded satisfaction to all concerned in it; and it may well be doubted, from what we know, whether any merchant operating on his own account did so without participation in his ventures on the part of his lord and master and of the ruler of the State with which he so dealt. The requirements, it may be remarked, of the bulk of the rude populations of Asia would necessarily be small, and there was probably little or no demand for choice and costly merchandise outside the courts of the palace.

I entirely agree with M. Severtsof in his supposition that most of the caravans terminated their journey at the *Statio Mercatorum*, and there purchased or obtained in exchange the productions of China, without penetrating as far as "Sera Metropolis." This has always been my own opinion. I only omit the "Bactrian" from the trade of such *Kafilas*, and differ from him and others in respect of the whereabouts of the *Statio* and of the applicability of *Sera* to the metropolis of China.

As regards Samarcand, whatever may have been its greatness and glory at any period before the time of Alexander, or, for the matter of that, even of Cyrus, information seems entirely wanting to justify the conviction that Samarcand conducted a lively and rich foreign trade, or that it was a great commercial centre on a line passing with but chance interruptions from Persia to China.

The great antiquity of the place is assuredly not to be questioned; its greatness in the unknown ages of the fabulous Feruddin is perhaps attested by the now mute ruins buried in the mounds around and about the present city; but the inhabitants were a rude class of beings in the time of Alexander. The face of the country had long been changed; the great waters of life had long subsided; the rivers had been long diverted; the waters had parted, whether by Providential agency as taught us by the prophet Ezekiel, or by physical agency as argued by Herodotus; and ruthless hosts had perpetually swept over the entire land. The period of the temporary brightness and prosperity of Samarcand, recorded by the Emperor Baber, and by Abul Ghazi from native data, in no way affects my present argument: it left "not a rack behind."

The markets of Central Asia are merely jostle marts, even at this present hour, and the trade—the native trade, that in which Europeans are not found to participate—is the merest petty barter, presenting without doubt a far greater activity than was the case in the olden days. The only trade that pays or yields a revenue to the Russian Administration in Turkestan is the transit trade; no other—according to the Russian

authority, Nebolsin, or according to the late Russian Professor Grigorief —has more than the value, in that Professor's own words, "of an empty egg-shell."

At the same time, just as water will find its level, so also there must have been courses of some more or less regular traffic, and those courses, at a time when trade could not have repaid great risks, must naturally have run in the easiest directions; and so there is every indication that the easiest direction Chinawards, geographically as well as politically, lay from Samarcand, up the Chirchik affluent of the Jaxartes by the Issyk Kul, and up the Ili valley into Northern Mongolia.

It is, to my mind, in view of all this, arguing from assumed premises to say—in echo, it is true, of a common opinion—as was said by M. Severtsof: "Samarcande étant la ville la plus proche de Ferghana, c'étaient les marchands de cette ville qui, dans des circonstances pareilles, devaient songer les premiers à ouvrir une route commerciale en Sérique."[1] This is taking it for granted as a well-known and acknowledged fact that Samarcand had a flourishing trade, conducted by an energetic mercantile community, when the silk of China reached the matrons of Rome. Who knows that such was really the case? But to pass over this, it was no easy matter at the period referred to for a *Kafila* to wend its weary, tedious, and dangerous way any given distance. No "diplomatic action" could have availed in the cause of such a commerce, and it may be supposed that there was at the time no unity of action of any Asiatic commercial fraternity or of any local "Chamber of Commerce." Where is the evidence of so great an impetus to trade as that which could alone have forged for it so difficult a passage as that, for example, through Karateghin "en evitant le Ferghana"?

I am not in a position to enter at present more exhaustively into this matter, but I will note some further observations of the late M. Severtsof wherein I detect discrepancies between his quotations and his sources—*lâches* and *lacunæ* which render him untrustworthy where he adduces secondary evidence.

In the first place, in confirmation of his argument, he states that at all times, "commencing with Kuteyba and ending with Yakub-Beg (1864)," the invasions (from the West) pursued without exception only one route, that of the Upper Kashgar Daria.[2]

As referring to invasions of Kashgar, this is so, for there was but one practicable route to pursue *from Ferghana*; but how can it be made to follow from this that, *ergo*, the trade-route from Samarcand necessarily followed only this direction to China?

The great Yue-chi are distinctly said in the Chinese annals of different periods, translated by Father Hyacinthe, to have been a nation of pure nomads. I cannot discover the grounds upon which M. Severtsof, while giving those people their proper location in one paragraph, in another treats the country of their occupation as synonymous with Bactria. But this may be because he found it stated that the Yue-chi had overrun (but only overrun) Dahia.

[1] *Anciens itinéraires, etc.*, Bulletin, 2me trim. 1890, tome ii. p. 438. [2] *Ibid.* p. 579.

Great capital is made by M. Severtsof in his *Anciens itinéraires* of what he finds in Chinese annals confirmatory of his opinion relative to trade and to a track through Karateghin.

The fundamental error, which has long been shared by others, consists, I think, in the arbitrary and mental perpetuation of a kingdom of Bactria possessed by a cultivated people struggling for commercial outlets. There is not a particle of evidence to show that either Greece or Rome, when Bactria had relapsed into barbarism, knew anything more about Afghan Turkestan than was known to Europe immediately before the annexation of that territory by Dost Mahommed of Cabul. And, this being so, it is building on a purely imaginary foundation to raise up a Bactrian commerce at any period after the total obliteration of the province north of the Hindu-Kush, which became detached from the Scythian portion of the Greek monarchy.

History takes no cognisance of the existence of a consolidated power in that quarter, through which even Persians could have been induced to trade with the remote East. Father Hyacinthe tells us that the Chinese sent ten embassies, one after the other, to various States in the western parts of Asia, "to blazon the glory of China after the overthrow of the Huns . . . and the subordination of Davan;" but, otherwise, we hear of only occasional tributary mission caravans, which brought to China chiefly excellent steeds from Davan, jade from Kashgaria, and luxurious and wonder-working rarities from India and from the Southern Ocean, all of which penetrated to China by following two, and only two, main channels through Asia. I here leave out of the question the maritime commerce and the possible communication through Burma, Southern Tibet, etc.

The productions of Northern India would naturally have passed across the Himalayas, or even through Wakhan. Why should Bactria, which held the key to this route, have denied herself its facilities in order to traverse one which was circuitous, intricate, and perilous? A local traffic between Balkh (Bactria) and Sogdiana there may have been, but we have yet to learn that Balkh had products to dispose of, whether its own or accumulations from Persia, which needed a market in China, and were conveyed thither, either *viâ* Samarcand, or up the Surkh-ab or Karateghin river. Equally improbable is it that there was a commercial or any highway through Badakhshan by Shiva to the Bartang and thence over the Bam-i-Dunia to Kashgar.

Through Wakhan and Northern Tibet or by Khotan there had always been a passage adequate to the exigencies of any possible Bactrian commerce with the East, and this was the one continuous line along which the mineral wealth of the mountain ranges in the parallel of latitude here indicated was exploited for the benefit of China, from the ruby mines in the Hindu-Kush to the gold veins in the further elevations of the Lob-Nor—a line of country which, according to Chinese annals, was known to China when Sulé was to her a mere hearsay.

Chinese chroniclers were always extremely precise, even while exaggerating the significance of the protestations of submission to their emperors by various rulers: never alluding to anything of which they had

not a positive knowledge, never taking notice of a country which was not in some sort of relation with their Government, and never omitting any point deserving of record or showing the grasp of the "Celestial" hand. Thus we may read, between the lines of the following extract from the history of the Han dynasty, the names of the several regions from which China was supplied with the commodities named, and the directions they pursued in reaching China :—

"The chambers of princesses were filled with glittering pearls, tortoise-shell ornaments, transparencies made of the horns of the rhinoceros, plumage of the beautiful southern roller. At the palace gates appeared fine steeds of the best breeds, immense elephants, lions, hounds. Large birds in flocks found homes in the outer menagerie . . . precious foreign rarities poured in from all sides. The Son of the Skies, under a splendid canopy, in sumptuous array, reclining against a small table of jade, made wine flow from its sources, and threw open parks of viands, in the entertainment of foreign guests."

But when was this great influx into China of all these luxuries from the far West? It began only in or about 100 B.C., *i.e.* some time after the temporary release of China from the overwhelming power of the successors of the Hun Modi, and in consequence of the extension of Chinese authority into Western Turkestan through Davan.

The elevation of the Elder Han dynasty is referable to 202 B.C., when the regions of the Upper Oxus were again in utter darkness to all outsiders. "It was at this time that Modo the Hun arose, vanquished the Dun-hu, expelled the Yue-chi,[1] struck terror into the Man nations, and conquered the Western Tsans."

It was during the brief reigns of five successive Chinese emperors of the Han dynasty, from about 100 B.C. to A.D. 15, that China maintained anything like a hold of, and relations with, the far West, of which Bactria still remained the most obscure corner, for that corner is but vaguely referred to in Chinese chronicles. Whatever may have been the knowledge possessed by the Chinese of the routes traversed by their commissioners, it was in no degree shared by any nations of the extreme West, and much less by geographers of the Roman Empire. If there were facilities for intercommunication between the several provinces of the West, nominally or practically subordinate to China, those provinces were obviously, as we may gather from all accounts, not easy of access across their western confines, exclusiveness being the characteristic feature of the Chinese of those distant days as of our own, and an almost equally distinguishing feature of Asiatic states singly and collectively.

It has been argued by Sir Henry Rawlinson[2] that three streams of

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[1] *Chinese History of Thibet and Khukhu-Nor*, translated by Father Hyacinthe, vol. i. p. 17. And this is what is said therein about the Yue-chi : "Yue-chi was the name of a people of Turk race nomadising in the steppe to the north of the city of Dun-huan, to the north-west from the Great Wall, over against Ordos, as far as Hami. This people, decimated by the Huns, retired into Jungaria ; soon, however, the Yue-chi were expelled thence by the Kalmucks ; they descended from the mountains to the south-west and west, and occupied the country which now constitutes the dominions of Bokhara.

[2] *Proceedings R. G. Socy.* 1869, vol. xiii., and for 1884.

commerce flowed across the Pamirs of the Bam-i-Dunia from the west, from Bactria or Balkh: one leading to Yarkund through Wakhan and Sari-kul (over the Great Pamir), another up the Ghund river through Shighnan and by the Alichur (Yashil-Kul) and Rang-Kul lakes direct to Kashgar; the third up the Surkh-ab or Kizyl river of Karateghin through Khotl. This argument applies, as I take it, to the Arab period of conquest in Central Asia, and for that reason I am not prepared to contend so strongly against the argument; yet I will even here venture my objections.

The arteries in question may have lent themselves at different times to rushes of invasion, but the *Kafila*, with its measured tread and halting pace, even now traverses the sinuous paths across the Bam-i-Dunia only over its southern extremity, and in very attenuated form, and, suffering by the constriction of those arteries, dribbles through, if it passes at all, with pain, trouble, and anxiety. This was so, at least, very recently.

With reference to the third of the above-named routes, there is no historical evidence of its ever having been a recognised line of traffic. The stone bridge, Pul-i-Sengin, on the Surkh-ab, cannot be taken as testifying to the fact of a traffic which is now discontinued, and which has not existed in "piping" times of peace within our ken. But there are two other bridges over the same section of the river; yet this plurality does but bring nearer home to us the justice done to the beauty of the country by the Arab writers, by Baber and others to this day, who have written in raptures about the lovely and luxuriant valleys of the Waksh or Surkh-rud of Khotlan, even as Baber was ecstatic over his own country of Ferghana, and as Russians now describe in glowing terms even some of the valleys of the Pamirs.

These valleys, it would appear, were long ago well populated. They were esteemed terrestrial paradises; they were coveted and invaded from the south-west; and as Uzgend in Ferghana guarded that "happy valley," so did Gharm and other places—Kila-i-Khumb, etc.—defend Karateghin, Darvaz, etc., not against invading hordes from beyond the frozen Muztagh in the Kashgar range, but against periodical descents of predatory bands from the Alai and pamirs immediately overhanging, just as they stemmed the tides of Persian, Greek, and Arab invasions from the West.

Proceeding further up the Karateghin river, we find it perfectly impracticable for caravans.

As for the Alichur-Rang-Kul route, it is a pamir track pure and simple, having no continuation westwards, and no apparent connection with Balkh. So far as regards communication with the West, this route leads to the banks of the Oxus; but we cannot well believe in any serviceable link in the long past between either Kila-Wamar or Bar-Panj and, let us say, Faizabad on the Kokcha.

The route through Wakhan and by Sari-Kul, or Wood's Lake—that which was traversed by Hwui-Sang and Tung-Yun, A.D. 518, by Fa-Hian 400, by Hwen-Tsang, 629-45, and by the Jesuit Goës, 1603—was most probably the only recognised "through" route lying across the Bam-i-

Dunia, and it is along this section of the southern line that ruined habitations and *Kilas* are now found—traces of the handiwork of passing multitudes.[1]

In the last few years of the life of the Emperor Baber, Said-Khan of Kashgar invaded Badakhshan by way of Tash-Kurgan and Wakhan. This, I think, is a point upon which I may justly lay stress.

As observed already, the Arabs did not pursue their conquests in an easterly direction from Khotlan and Washgird; the ramparts of the Bam-i-Dunia were insurmountable for their hosts, and their battles here with the mountaineers were of the bloodiest, by reason of the natural defences in the valleys. They accordingly diverted their course, turning northwards and terminating a career of arms in the Siberia of the Russians.

The Russian, Ivan Khokhlof, who was sent to Bokhara by Ivan the Terrible,[2] and Philip Nazarof, who was despatched from Siberia to Kokand in 1813,[3] heard of Saracens, or black-faced Arabs, as occupying the wildernesses of the Pamirs. Anthony Jenkinson alludes likewise to similar people, deriving his information, doubtless, from those Russian sources.

I mention this only as a curious item, based only on unverified report, and not as having any special bearing on my subject.

All the foregoing coincides with Erskine's geography, with Wells Williams, with Russian as well as with English and with Oriental authorities, and Ptolemy will yet serve in this attempt to advance my view.

Serica.—The *ultima Thule* of my routes through Inner Asia is Serica, and, as briefly as I can, I will, with all due reserve, venture an identification, well knowing how this particular question has been as good as solved and laid finally to rest by an eminent authority whose labours were most assiduous and conscientious. I owe it to his memory as a tribute of grateful recognition that he at one time expressed to me his opinion that I was competent, and that I ought to have undertaken the reproduction of the travels of Anthony Jenkinson; and it is with great deference to his opinion that I now venture an opinion of my own which is opposed to the conclusion at which he arrived. But as he was himself an unflinching champion of geographical *bonâ fides*, and of the most minute facts in the field of his investigations, I shall assuredly incur no blame for reopening a question which he had long settled for us, and for turning any little light even in the same direction in which he cast his penetrating and luminous rays.

I note first that the Serica of the Romans was taken by Rennell to be Eastern Turkestan. The late Colonel Yule demonstrated (see his *Cathay and the Way Thither*) that under the name of Serica the ancients undoubtedly comprehended China—the silk-yielding country (Sericum).

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[1] Wrongly attributed by Russian writers to merciless hands of modern Afghans. The *Pir* M.S., who journeyed in 1879-85, says that these ruins are put to the account of Kafirs, according to local tradition.

[2] Prince Hilkof's *Collection of State Papers*, 1879. (In Russian).

[3] Nazarof's *Narrative*, 1821. (In Russian).

The *Serica* of Ptolemy lay beyond *Imaus*, beyond the Issedones and the Ochardæ as those races were located by him. Now, I firmly believe that, if there was a region so called, it must have been as distinct from China as was Bactria from Egypt. The Greeks knew nothing of China by land, and, whether in Bactria or in Sogdiana, they would naturally have heard of a people through whose medium alone access from the north-west land side was obtainable to a country of which that people were, to use an expression of Peter the Great, "the key and the gate"—that country being *Sinæ*, and known to the Romans under that name by sea. Ptolemy seems to have had a true inkling of the Kitans or Cathayans in his Chatæ Scythæ, and the Persians had the correct *Chin* (Thsin).

Nor was it Ptolemy who took Serica to be the same as Sinæ, or Thinæ, Chatæ—Kitay—China.

The Romans knew silk, their matrons wearing it before it came to be imported to them by sea. It had come to them from a place where silk was called Serighé, and the material itself was accordingly called *Sericum* by the Romans, and its supposed place of production was therefore named *Serica*. Moreover, they had more than the name alone of the material to guide them in the naming of the supposed country of the silkworm.

Through Persia they must have received reports of a region called Serighé and of a people called the Seres, who were the great go-betweens in the north-western trade of China or of Manchuria.

We have still traces of such a name and of such a people, and there is something more than a floating suspicion of their reality in the past.

The frequent dislocation of populations in Asia, from China to the Caspian, is the great feature in the history of that part of the world, and we know the great difficulty of reducing any one fraction of the Asiatic races to a common denominator by reason of the prevalent custom of the various tribes to change their names and assume those of their successive leaders. A townsman of Central Asia will tell you whether he is an Uzbeg, a Tajik, or an Iranian, but a nomad Kirghiz will tell you he is either a Naiman or a some one else—he revels in the patronymic. It is by this means that we are acquainted with the Turks under their various names of Mongol, etc. So the *Seres* were presumably an offshoot of some Hun or other race which sprang from the cradles of mankind in the mountains over above Manchuria; or they were a tribe of Tungut Mongols settled for a space where Modi the Hun held sway, hurling his might against China in the south, and piercing with his javelins the very breast-works of Europe. For a period during the Han dynasty the Hun under that name disappeared from the seat of his glory on the Orkhon, and we seem to see the place occupied during that interval—an interval corresponding, too, with the period of the open relations of China with the West—by a race named Seres (Ceres), or by a powerful and numerous tribe bearing the name of their patriarch or ruler for the time being. Chinese chronicles mention the frequent downpour of hostile races from the Hingan mountains, and they write voluminously on their continual struggles with the Mongols of Khukhu Nor, naming the various tribes, many of which it is now impossible to identify, whom

they subjected to customary displacement after their defeat and subjugation. On the north-western side, towards Manchuria and the Altai Sayan mountains, "barbarians" could and did exercise a freer hand, and in that direction China always encountered great and dangerous animosity.

In his history of the first four Khans of the "House of Jenghiz" (1829), Father Hyacinthe, deriving his information from the Chinese *Hanmu* and from the Chinese history of Jenghiz Khan and his posterity, says "there was a country called Khési, bordering on the northern frontier of China from Ordos west to Hami, which in the time of Jenghiz Khan was named Hashi (Khashi) by the Mongols, otherwise Hasi (Khasi), by which they comprehended the northern limits of the kingdom, which became known to Central Asiatic historiographers by the designation of Tangut." If this was so, it goes some way in corroboration of Ptolemy's delineation of the *Casii Montes*, which are supposed to be the Kashgar meridional range, and to have been so named, as we have seen, after the present city in that region, but which, in my opinion, were named after the Kash of Goës.

It has been hitherto overlooked, I think, that the Chinese chronicles have distinctly recorded the fact that their Emperors gained access to the Western provinces as a result of the reduction of the power of the Huns, and through the territories proper of the Huns on the northern frontier, not from the western frontier, whence their advance was to Khotan; these territories of the Huns were the country of the Selenga and Orkhon rivers. The route to them lay from Ordos northwards by the present Urga, where there are ancient ruins, and by no means westwards across the whole breadth of the terrific Shamo.

We have, then, very good evidence of a people called Kéré, Séré, or Céré, established, at the period of open relations between China and the far West, at a point through which we know that Chinese had to pass on their way even to Davan; and their capital was most probably the Khéré-Khérin of Chinese histories, Kéré-Korum or Kara-Korum, the capital in later times of Jenghiz Khan. This site, with the "tree of happiness" under which this ancient city stood, was visited in 1871 by M. Paderin, and some years later by Mr. Ney Elias, and was astronomically determined by M. Yadrintsef, in 1889, as in 47° 15′ N. lat. and 102° 20′ 15″ E. long. of Greenwich.

The great antiquity of the place is attested by the extent and character of the ruins, by the curious inscriptions on the stones—which have, however, to be yet further examined and deciphered—and by the references to it in ancient Chinese chronicles. It now receives the go-by, since the road to and from Kashgaria strikes across the Gobi and emerges on Barkul and Hami, and the Kiakhta Kalgan route to Pekin skirts it on the east.

The Khéré (Kéré), it is stated,[1] were, like the Naiman-Kereits and numerous other clans, an offshoot of the Tungu race; and remnants of them are doubtless to be found, together with others of kindred origin,

[1] *History of the First Four Khans, etc.*, p. 32.

among the Naiman and other Kirghiz of the Bam-i-Dunia, where in early times they sought refuge from inveterate enemies of their race.

It requires no great stretch of imagination to see in Kéré-Khéré the Céré or Séré of the Romans, and by natural gradation of Asiatic change to come at the root of Kara (also meaning black) in the double name which the Burut and their kindred have assumed—Kara-Kirghiz; and here I would observe that the Cérés (a village on the Bartang-Murghab-Aksu, at a western foot of the Pamirs), revealed to us in 1879 by the Pir M.S., awakens a degree of interest with reference to this surmise.

Serighé is a proper name in the Manchur tongue,[1] and it means throne; "to receive the throne" is the expression used in Chinese histories to signify assumption of imperial power. This might explain Serica and *Sera Metropolis*—the Seat of Power of the Sérés. But this is also the Manchur for seed, grain (cereal ?), and silk; it expresses larvæ—of flies and silkworms; the Mongol word being also *Serke* or, rather, *S*serke[2] (=Cerke).

If there be anything in what I have brought forward, it will serve to corroborate the notion which it appears to me was entertained by Ptolemy concerning the Sérés and Serica. He placed Serica where, on the maps attached to Father Hyacinthe's excellent works, I find the *Kéré*; for his river Ochardes I take to be, not the Kashgar river, but the Selenga or the Orkhon, and his *Sera* by a lake at the source of his Bautisus *fl.* answers to Urga, if not to some other neighbouring ancient site not yet identified.

The accompanying copy of Ptolemy's scheme will fully illustrate my meaning, and Ptolemy's comprehension of the matter bears out the theory which I have advanced.

I will conclude this portion of my paper with the observation that Ptolemy appears to exhibit only a compromise between his own belief and the notion as to the whereabouts of Serica popularly adopted in Rome, in the route which he traces along the 40° parallel of lat. from the *Turris Lapida* to *Sera*. Further, that he completes his journey towards China at *Sera*; and that the compromise which he makes results in his reduction of the northern and southern routes into a single line.

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[1] Zakharof's *Complete Manchuro-Russian Dictionary*.

[2] I. J. Schmidt's *Mongol-Germ.-Russ. Dictionary*, 1839. It has the sound of double *s* in Mongol (hence Ceres), and presumably *k* by permutation.

(*To be continued.*)

THE FIRST ITALIAN GEOGRAPHICAL CONGRESS.

By Dr. George Smith, C.I.E., F.R.G.S.,

Representative of the Royal Scottish Geographical Society.

In April last the Società Geografica Italiana, whose headquarters are in Rome (Via del Collegio Romano, 26) invited our Society to send a delegate or representatives to the first Geographical Congress ever held in Italy. Genoa was chosen as the seat of the Congress, being undoubtedly the birthplace of Columbus, although he spent his childhood in the neighbouring port of Savona. The time fixed was the ten days from the 17th to the 26th September, immediately following magnificent naval *fêtes* off the city, when the King received the representatives of the Naval Powers of Europe and America, and preceding the celebration of the discovery of Guanahani afterwards held at Huelva in Spain and all over the United States of America. The dates of the commemorations of the fourth centenary of Columbus are these :—

1892, *August 3rd*, on which day in 1492 Columbus sailed with 120 men in one ship and two boats westward on his first voyage. Observed at Palos.

1892, *October 12th*, on which day in 1492 Columbus landed at Guanahani, now Watling Island, one of the Bahamas group, and there erected the Cross of Christ. Observed at Huelva and in the principal cities of North America.

The Geographical Society of Italy summoned its first Congress, not solely because of Columbus, who, after all, was preceded by the son of the other illustrious maritime republic, Venice—Marco Polo. The Society had two modern and very practical reasons besides. With the hearty consent and help of Great Britain, Italy possesses a new colonial dominion in Eastern Africa that marches north of our own, and fronts our Arabian territory, with a length of coast as great as 670 miles. This colony of Eritrea, as it is called since 1890, of which Massowah is the centre, moreover, is virtually the protector of the oldest of Christian empires, that of Abyssinia, under the treaty of 2nd May 1889 between Umberto I. of Italy and Menelek II. of Shoa and Abyssinia. Even more important to Italy at present, however, is the fact of the constant stream of emigration from its underfed and overtaxed villages to the republican territories in South America. Every year nearly a quarter of a million of Italians depart to form a new home in Brazil, Argentina, and other American countries. The Congress at Genoa was occupied with questions arising from these facts. When next it meets in 1895 at Rome, where there is then to be a great exhibition also, the colonial and emigration interests will require still more detailed consideration. It is to be hoped that our Society may then be well represented. The only English-speaking delegates at the Genoa Congress, besides myself, were Mr. Steinthal, the energetic chairman of the Manchester Geographical Society, and another; and Miss Maria E. V. Cust, who took the place of her distinguished father. It is deeply to be regretted that none of the four members of Council appointed by the Royal Geographical Society appeared. The United

States of America was represented by Mr. A. L. Rotch, of the Meteorological Observatory, near Boston. All the other nationalities of civilised countries were well represented, while Italy itself, and especially Genoa, raised the number of delegates to about 800. Nothing could exceed the warmth and splendour of the reception given to the Congressisti by the Court, and by the princely Municipium of the city. The Duke of Genoa, brother of the popular Queen Margherita, entertained them at an evening party in the Royal Palace. The new opera of *Christopher Columbus* was produced for the first time for their pleasure. They were fêted by the Municipality at a banquet. Above all, a steamer was chartered, and for a day, under a cloudless sky, upwards of four hundred of the members coasted along the Riviera.

For six days the work of the Congress was much more severe and useful than these festivities would lead the reader to suppose. The Palazzo of the University, a noble building, was set apart for the meetings. After stately receptions by the President, the Marquis Giacomo Doria, and the Sindaco of the city, the Congress broke up into three sections, which sat from ten to twelve and from three to six o'clock daily. The first section was the "Scientifica," the second the "Commerciale," and the third the "Didattica."

The language of most of the papers and discussions was Italian, but French was occasionally heard. The last day of the Congress was devoted to the achievement of Christopher Columbus. I had left Genoa for Venice by that time, but a summary of my paper on "The Missionary Aspect of the Work of Columbus" was most kindly read by Miss M. E. V. Cust. The best-known members of the Congress were Casati—who was presented by the Marquis Doria as the companion of Gessi, Emin Pasha, and Stanley—and Cora, who presided over one of the sections. The most popular of the three sections was the third, being devoted chiefly to the educational questions connected with Geography. Public instruction has taken a remarkable start in Italy under the present King, and the section was crowded by professors and teachers, who spoke with eloquent warmth and gesticulation. The increase of school attendance by ninety per cent. in one generation is full of hope for Italy's future. The twenty-one Universities, of which that of Genoa is the second in rank, have a staff of about a thousand professors and tutors, and are attended by seventeen thousand students.

Hardly less important than the Congress itself was the Geographical Exhibition, held in twelve saloons of a new Institution in the suburbs of the city, close to the popular Italo-American Exhibition, which was nightly crowded. This Prima Mostra Geografica Italiana, the catalogue of which covers 165 octavo pages, was more extensive and educational than any yet seen in this country. I have deposited in our library its general catalogue; also the principal printed papers read or submitted to the Congress, including a volume of some 200 pages on the *Industrial Condition of the Province of Genoa*, and a beautifully illustrated work by Elio Modigliani describing his travels among the independent tribe of the Batacchi and the great lake of Toba in the centre of the island of Sumatra. It is possible that some of the papers may be noticed in our *Magazine*.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

APPOINTMENT OF SECRETARY.

Lieutenant-Colonel Bailey, R.E., has been appointed by the Council to fill the office of Secretary and Editor to the Society, in succession to Mr. Silva White, resigned.

After several years of military duty, including active service in Bhután (medal), Colonel Bailey was, in 1871, attached to the Indian Forest Service, and shortly afterwards was intrusted with the formation and superintendence of the Survey Branch of that Department. He continued to hold this charge until 1884, when a very large area of forest-land, partly in the hills and partly in the plains, had been surveyed and mapped. In 1878 he was appointed a Conservator of Forests, and organised the Central Forest School, of which he was the first Director. He held this appointment until 1884, in addition to that of Superintendent of Forest Surveys. When on furlough in England, in 1884, he was appointed by the Secretary of State for India to the charge of the English students at the French Forest School at Nancy. He visited forests in various parts of France, as well as in Switzerland, Germany, and Hungary, and published notes on them in the *Journals* of the Royal Scottish Arboricultural Society (Gold Medal) and of the Botanical Society of Edinburgh. In acknowledgment of his services to the cause of forestry, he was, in 1887, awarded the Cross for *Mérite agricole* by the French Government.

On Colonel Bailey's return to India, in 1887, he was appointed temporarily to the Conservatorship of the Punjab forests, and was shortly afterwards selected by the Government of India to act as Inspector-General of Forests. In 1889 he was a second time selected to fill the office of Inspector-General, but was prevented from taking up the appointment by a temporary illness, which obliged him to return to England.

Colonel Bailey is Lecturer on Forestry at the University of Edinburgh. He is a Fellow of the Royal Geographical Society (London), and also a member of the Royal Scottish Arboricultural Society, and of the Botanical Society of Edinburgh.

ANNIVERSARY DINNER.

The Eighth Anniversary of the founding of the Society was celebrated by dinner of the Council on the 19th October at the Waterloo Rooms. In the unavoidable absence of the President, His Grace the Duke of Argyll, the chair was taken by the Marquess of Lorne. The dinner, which was attended by about seventy members and their guests, among whom was Mr. Douglas Freshfield, Hon. Secretary of the Royal Geographical Society of London, was made the occasion of presenting Mr. A. Silva White, the retiring Secretary, with a testimonial and the Diploma of Honorary Fellowship. It is proposed in future to make the Anniversary Dinner an annual institution open to all Members of the Society.

DEPUTATION TO THE SECRETARY FOR SCOTLAND.

A deputation from the Society, consisting of Mr. John Cowan of Beeslack, Mr. A. L. Bruce, Dr. George Smith, Dr. W. Scott Dalgleish, Mr. W. B. Blaikie, and Colonel Bailey, waited upon the Secretary for Scotland in Parliament Square on the 20th October, to request that the Government would forego the rent of £120 now paid for the use of the rooms in the National Portrait Gallery. Sir George Trevelyan promised a careful examination of the question, and to make a representation to the Treasury on the subject if he found sufficient grounds for doing so.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A., F.R.S.E.,

Librarian, R.S.G.S.

EUROPE.

British Rainfall, 1891.—During last year, as Mr. Symons remarks in his annual volume, many exceptional and, in some cases, unprecedented phenomena occurred. Amongst these he mentions the drought in February, the West of England blizzard in March, the wet months in the latter part of the year, and the extraordinary disproportion between the rain of the early and later parts of the year. September 1865, when 17 per cent. of the meteorological stations registered a fall of less than 1 in., and 6 per cent. recorded no fall at all, was far surpassed by the February of 1891, in which month 60 per cent. of the stations made a return of under 1 in., and 13 per cent. had none to record. The deficiency was greatest in England, particularly in the south and east. In the north and west of Scotland there was no important deficiency. The rainfall during the whole year was, however, somewhat above the average, owing to heavy autumnal rains. The excess above the average of the years 1880-89 was 10 per cent. in England and 3 per cent. in Scotland, Ireland showing only a trifling difference. In England and Wales 37·36 inches of rain fell, in Scotland 43·59, and in Ireland 39·35, the average for all the stations being 39·41 inches.

The Population of Scotland.—The report of the tenth decennial census (1891), now issued as a Parliamentary *Blue Book* of 368 pages, shows a few slight differences from the figures extracted from the *Preliminary Reports* and published in vol. vii. p. 490. The total population of Scotland is now ascertained to have been 4,025,647, of whom 1,942,717 were males and 2,082,930 females. The enumerated increase during the ten years 1881 to 1891 was 290,074, while the excess of births over deaths was 507,492, so that there was a loss of 217,418 due to emigration. The rate of increase, 7·77 per cent., is lower than in any of the preceding decades, except in that ending in 1861, when it was only 6 per cent. At the present rate the population of Scotland would double itself in 89 years. In 15 counties there was a decrease of population as compared with the numbers obtained in 1881; in seven there was an increase of 10 per cent. or more, and in seven others the increase did not amount to 5 per cent. 65·37 per cent. of the inhabitants resided in towns, as compared with 61·75 in 1881. The people living in villages were 11·57 per cent. of the whole, the proportion having been nearly stationary, while the residents in rural districts fell from 26·26 per cent. in 1881 to 23·06 in 1891. Taking the whole country, there were 135 persons to a square mile, or 4·7 acres to each person. The distribution of population among the counties varies very considerably, from 11 persons to a square mile in Sutherland to 1199 in Edinburgh.—*The Times*, Aug. 23rd.

The Bandaksvand and Nordsö Canal.—On September 20th was celebrated the opening of this great engineering work. Ulefos, on the western bank of the Nordsö, is connected by a river with a chain of lakes consisting of the Flaavand, Hvidesö, and Bandaksvand. This river has now been canalised, and a passage for steamers opened to Strengen on the Flaavand, nearly 14 miles from Ulefos. Great difficulties have been met with in the blasting of locks out of the solid rock to enable vessels to ascend above the Ulefos, 36 feet high, the Eidsfos, 33 feet, the

Vrangsfos, 75 feet, and other smaller changes of level. At Vrangsfos the difficulties were most formidable, both as regards the construction of the five locks and the regulation of the upper waters, for which purpose an immense weir of masonry had to be constructed. The length of the locks is 124 ft. 8 in., and their breadth 26 ft., with a depth sufficient for vessels drawing 8 or 8½ feet of water. There are in all fifteen locks, which elevate the waterway to a height of 189 feet above the Nordsö, and 236 feet above the sea-level. The Nordsö was connected with the open sea as far back as 1861 by two locks at Skien and four at Löveid. The chain of lakes thus opened to shipping extends over a distance of 32½ miles, from Strengen to Dalen. From the latter point a new road, twenty miles in length, has been constructed to Vinje in the Grungedal, on the route to Stavanger and Bergen. By these improved means of communication an easy and comfortable, as well as picturesque, route is opened between Christiania and the west coast.—*Scotsman*, Sept 28th.

ASIA.

The Indian Marine Survey.—Lieutenant Gunn, R.N., who on the death of Commander Hoskyn was left in command of the Marine Survey, has sent us his *Administration Report* on the work carried out during the season 1891-92. The first investigation noted was an examination of the mouth of the Godávari and neighbouring areas, after which the *Investigator* steamed to Ceylon, deep-sea soundings being taken on the way; then a series of soundings were carried out to Jáfárábád, Káthiáwár, for the purpose of more accurately determining the position of the 100-fathom line off the west coast of India between the parallels of 10° and 13° 50′ N. Here the boat party was left. Between the 11th of May and 13th October the staff proceeded to Poona to work up results, when twelve new charts were drawn on scales of from half an inch to twenty-five inches to a mile, including plans of the Cocos Islands, Marshall Channel, Coconada Anchorage, Verával Harbour, and others. Coast sailing directions were also compiled and published. On the resumption of the survey proper the boat party was dropped at Deogarh, after which lines of soundings were carried over the Cora Divh, Bassas de Pedro, and Sesostris Banks, and the positions of Cherbaniani and Byramgore Reefs were determined. Afterwards the situations of Kiltan, Cardamum, Betra-Par, and Kalputi Islands, and of the Pare-Mul-Par and Piti Reefs, were fixed, sketch surveys being made of Kalputi and Aukutta Islands. Minikoi was afterwards visited, the position of the island fixed, and a plan made. After a call at Madras, a search was made for the reported City of Venice Reef, off Mirissi Point, Ceylon; but no appearance of it, or of shoal water, was found. At the date of sending in his report Lieutenant Gunn was able to announce that the coast survey had been completed up to False Point Divi, in lat. 15° 43′ N., long. 80° 53′ E.

Surgeon Alcock's report as naturalist to the Survey is, as usual, of the greatest interest, but is too minute to be noticed fully here, and readers are referred to the *Blue Book* itself. A few of the more strictly geographical results are, however, appended. A large number of soundings having been taken around the Lakadivh Islands and Minikoi on the west, and off the Malabar coast towards the east, the reporter concludes that the sea enclosed between these limits has a maximum depth of about 1400 fathoms, and an average depth in the centre of from 900 to 1000 fathoms. The minimum bottom temperature is about 37° Fahr., and the average bottom temperature in the centre from 37° to 40° Fahr. Towards the mainland the deposits are mainly of blue mud (land detritus), while towards the islands they consist of a grey, or white, coral mud, composed of materials supplied by erosion from the surrounding coral islets and reefs; from 40 to 90 per

cent. of this deposit was soluble in hydrochloric acid. Accompanying this coral mud a fine green sand was occasionally brought up. West of the islands a calcareous ooze prevails, almost entirely soluble in hydrochloric acid, and containing from 22 to 23 per cent. of shells of *Foraminifera*. The coral reefs and islands in the western part of this area were found to rise abruptly from the depths.

Surgeon Alcock believes that the neighbourhood of the Lakadivh Islands is subject to submarine volcanic disturbances, partly basing his theory on the fact that numerous shoals have been reported by traders which the Survey has failed to find after diligent search. He believes that gentle shocks would be sufficient to create banks of an unstable nature, so that the succeeding monsoon would be strong enough to disintegrate and remove them. But he appears to rely chiefly on what was observed on Cardamum Island and in its offing. Between the island and Betra-Par Reef three successful soundings were made, the deposit brought up being, apparently, the calcareous ooze already noticed. However, when the specimens came to be treated with hydrochloric acid, it was found that only about 60 per cent. was soluble, the remainder being in each case respectively: (1) a pearly white flocculent powder, amounting to about 30 per cent. of the whole; (2) a rich, red dust, forming 40 per cent. of the whole; (3) a greyish-brown flocculent powder, forming about 30 per cent. of the whole. These residues Surgeon Alcock believed to be composed of pumice; and, afterwards, a deposit of pumice, observed under conditions which make it difficult to believe that any mistake could have occurred, was reported from a spot on Cardamum Island considerably above high-water mark. These interesting dusts have been forwarded to Mr. Holland, of the Geological Survey, for special report. Should the reported presence of pumice in the position assigned to it be confirmed, it would appear that it could only have come there through local volcanic agencies.

The following table shows the soundings noted in the report before us :—

Position.	Fathoms.	Bottom.
Between Bombay and the Lakadivhs.	700 to 1200	
11° 30′ 55″ N., 72° 03′ 15″ E. .	865*	
11° 26′ 05″ N., 72° 03′ 15″ E. .	944*	
11° 17′ 25″ N., 72° 00′ 05″ E. .	854*	
14° 35′ 15″ N., 72° 02′ 37″ E. .	1140	Gray calcareous ooze.
12° 05′ 55″ N., 71° 33′ 30″ E. .	865 to 880	Impure Globigerina ooze.
10° 47′ 45″ N., 72° 40′ 20″ E. .	705	Large fragments of dead reef [coral.
10° 07′ 50″ N., 74° 42′ 30″ E. .	1250	
36 miles NE. of Minikoi . .	1370	
Immediately off Minikoi . .	1200	
6° 58′ 00″ N., 77° 26′ 50″ E. . .	902	

* The deposits brought up by these soundings were supposed to contain pumice, and have been particularly referred to above.

Beleapani Reef is a true atoll, composed of accumulated coral sand, shingle, cuttle-bones, and shells, and is only inhabited by hermit crabs. The lagoon was found to be shallow, with a bottom of coral shingle and masses of dead corals at intervals. There was no vegetation, nor were any seeds, nuts, etc., such as are frequently cast up by the sea, observed. Byramgore Reef is a submerged atoll, dry at low water. Cardamum Island forms part of an atoll, and is four miles long

by about half-a-mile broad. Unlike the other islands of the group, it is for the most part thickly covered with jungle, the screw-pine being conspicuous. The coco-nut palms are stunted, and do not form a marked feature among the other trees. The lagoon has a sandy bottom, with scattered bunches of live coral. Tree Island is the only part of the Betra-Par Reef left uncovered at flood-tide; coco-nut palms and *Carex* abound, and every bush and tree is covered by a species of convolvulus. Pare-Mul-Par Reef is an atoll of dead coral. Aukutta Island, part of an atoll, has a continuous, wide, and deep lagoon, and is densely inhabited, the huts of the people being built of hewn coral blocks. The flora presented no features of particular interest. Piti Bank is a dead coral reef covered with sand and shingle.

The Survey of India.—In the *General Report of the Operations of the Survey of India Department*, 1890-91, it is stated that during the year 117,915 square miles were surveyed in detail. The chief trigonometrical work was carried on in Upper Burma, where the series of triangles was advanced northwards for a distance of 44 miles along the meridian of 96° 30′, and 900 square miles were covered. In connection also with the Baluchistan survey, work extending over 960 square miles was executed, consisting of secondary triangles along the parallel of 30° N. lat. Four parties and a detachment were engaged in topographical surveys in the Bombay Presidency, Burma, the tin-producing tracts of Mergui, Baluchistan, and the Himalayas, with the result that 10,193 square miles were surveyed on scales varying from a half to four inches per mile. The large area of 100,848 square miles in comparatively unknown countries was geographically surveyed. Mr. Kitchen and a native surveyor made a rough reconnaisance of over 2000 square miles in the Baungshé country; and another native surveyor, attached to an expedition under Lieut. Burton, reconnoitred 13,000 square miles of country among the Kachin hills, east of Bhamo. Captain Renny-Tailyour accompanied an expedition to the eastern borders of the northern Shan States, and Mr. Kennedy travelled with the Kyengton-Chiengmai frontier mission, the former mapping out 5250 square miles, and the latter 9000. Captains Wahab and Mackenzie carried out topographical surveys in the Miranzai country, and the latter, with Colonel Holdich, mapped an area of over 5000 square miles in the Zhob valley. 23,500 miles were mapped by Mr. Tate and Sub-Surveyor Ahmad Ali in Mekran and on the Perso-Baluch frontier, on the quarter-inch scale, and 30,000 by Sub-Surveyor Imam Sharif in Persia, on the scale of one-eighth of an inch.

The Railway from Jaffa to Jerusalem.—This line, the completion of which was announced on p. 497, is nearly 55 miles long, and is of normal gauge. The Company obtained from the Porte a concession for seventy-one years, including powers to construct branches to Nablus on the north, and to Gaza on the south. The stations on the line, starting from Jaffa, are Lydda, Er Ramleh, and El Mansurah, and, beyond the Wadi es Surar, Seyid, Deir-Aban, and Bittir.—*Scotsman*, Oct. 1st.

Borneo: Anglo-Dutch Frontier.—By the late Convention, a copy of which is published in the *British North Borneo Official Gazette*, August 1st, it is decreed that the boundary shall commence on the east coast at 4° 10′ N. lat., and run between the rivers Sudang and Simengaris to the intersection of the meridian of 117° E. long. with the parallel of 4° 20′ N. lat. It is then to follow this parallel until it reaches the summit of the range, wherever that may be, which forms the watershed between the rivers flowing to the north-west coast and those flowing to the east coast, a certain amount of deflection being allowed in order to include the head-waters of rivers falling into the sea south of 4° 10′ in Dutch territory, and of

those falling into the sea to the north of this line in British territory. From the summit of the range mentioned, the boundary will run to Tanjong Datu on the west coast of Borneo, along the watershed between the rivers flowing to the north-west and west, and those entering the sea on the west coast south of Tanjong Datu, or on the south and east coasts. The island of Sebittik is also to be divided along the parallel of 4° 10′, the northern portion being British and the southern Dutch.

AMERICA.

Greenland.—On September 11th the *Kite* entered St. John's Harbour, having on board Lieutenant Peary and his party. In July 1891 the same vessel landed them at M'Cormick Bay, a little to the north of Whale Sound, in lat. 77° 43′ W., where a wooden house was erected to which the name "Redcliff" was given. Before the winter set in, trips were made by boat to various places, and hunting was carried on with great success, so that a goodly supply of meat was collected. Darkness lasted for 100 days; but though the temperature ranged from 30° to 50° below zero, none of the party suffered from illness, and even Mrs. Peary, who accompanied her husband on this expedition, bore the Arctic cold without inconvenience. On April 18th Lieutenant Peary and his wife started in a sledge drawn by thirteen Eskimo dogs for a tour about the islands and shores of Whale Sound and Inglefield Gulf, during which they travelled 250 miles, and named the twelve glaciers that descend into the gulf, as well as Mounts Daly, Putnam, and Adams, and the cliffs of Karnac. Shortly after their return to M'Cormick Bay the equipment and supplies for the land journey were carried up the slope of the inland ice till the true ice-cap was reached at an elevation of 4000 feet above the sea-level, and on May 15th Mr. Peary and Mr. Astrup set out with provisions packed on a sledge, being accompanied by a supporting party as far as the Humboldt glacier. Passing Petermann's Fiord, they came to the head of St. George's Fiord, and spent two weeks amidst storm and fog, struggling over the crevasses and steep ice-slopes of the feeding-basins of the St. George and Sherard Osborn glaciers. On June 20th, being then on the 82nd parallel, they perceived that the coast, which had hitherto appeared to the north-west, was visible on the north and north-east, and soon after turned eastwards, and finally to the south-east. Travelling in a south-easterly direction, they, after seven days' march, discovered a great bay opening to the east and north-east, which Mr. Peary named Independence Bay, and a glacier flowing into it, which he named Academy, after the Philadelphia Academy of Sciences. The bay lies in lat. 81° 37′ N. and long. 34° W. The land, reddish-brown in colour, was almost free from snow. Musk-oxen were abundant, and foxes, hares and ptarmigan and other birds were observed. Starting on their return journey on July 9th, Mr. Peary and Mr. Astrup reached, after seven days' march, the great plateau of the interior, at that part 8000 feet above the sea-level, and for fourteen days were enveloped in snow-clouds. On August 5th, when only five miles from M'Cormick Bay, they were met by the relief party sent out under the command of Professor Heilprin. This remarkable journey lasted ninety days, during which the explorers marched 1300 miles. Two points have been settled by the expedition—the northern limit of Greenland, and the extent of the ice-cap. Lieutenant Lockwood, of the Greely expedition, reached an altitude of 83° 24′ on the west coast, and sighted Cape Washington in lat. 83° 35′, while Captain Koldewey and Lieutenant Payer ascended the east coast as far as Cape Bismarck, in lat. 77°. It is now certain that between these limits the coast runs in a direction from north-west to south-east, and that General Greely formed a correct estimate of the northern extension of Greenland. As regards the ice-cap,

General Greely, in his address to the Society, stated: "It is evident the inland ice-cap of Greenland stops far to the southward of the 82nd parallel" (*S.G.M.*, vol. p. 605), and in his *Three Years of Arctic Service* (p. 361) he expressed the opinion that its northern limit lay to the south of Nordenskiöld, Nares, or Victoria Fiord. This opinion has proved to be correct, for Lieutenant Peary telegraphed from St. John's, on September 12th: "Greenland ice-cap ends south of Victoria Inlet."—*Scotsman*, September 26th, and *New York Herald*, September 13th.

East Greenland.—On August 20th Lieutenant Ryder (see vol. vi. p. 605) and his party returned to Dyra Fiord, in Iceland. They reached the coast of Greenland in July 1891, at the Pendulum Islands, the winter quarters of the German expedition of 1869-70, and landed the next day at Cape Hold with Hope. They failed to penetrate into Franz Josef Fiord, but on August 2nd were able to sail into Scoresby Sound, and, finding it impossible to approach Cape Stewart on the northern side, where they had intended to fix their quarters, on account of the ice, they advanced up the fiord to Hekla Harbour, in lat. 70° 27′ N. and long. 26° 12′ W., and there passed the winter. From this position it is evident that the Sound extends much further westwards than was supposed by the discoverer in 1882. The inner fiords were explored for a distance of 50 miles from the coast, and a large collection of scientific objects was accumulated. On August 8th, 1892, the winter-quarter was abandoned, and, passing Cape Brewster on the 12th or 13th, the *Hekla* followed the coast southwards to 69° N. lat., where the ice was too close for ship or boats. Accordingly, the vessel's head was turned towards the open sea, and its course directed to Iceland. After taking in provisions and water, Lieutenant Ryder intends to return to East Greenland in the hope that he may be able to land in about 68° N. lat.—*Petermann's Mitt.* Bd. 38, No. 9.

AUSTRALASIA.

The Elder Expedition.—When Mr. Lindsay left the expedition in January, he appointed Mr. L. A. Wells to the command, and ordered him to make excursions into the unknown interior of West Australia. On April 21st. Mr. Wells telegraphed as follows:—"Our depôt lies in 27° 10′ S. lat. and 118° 50′ E. long. From here we marched 310 miles to the east-south-east, as far as 27° 53′ S. lat. and 124° 5′ E. long.; then 27 miles to the north-north-east to 27° 3′ S. lat. and 124° 25′ E. long.; then again 210 miles north-westwards to 26° 22′ S. lat. and 121° 10′ E. long.; and lastly 180 miles south-westwards back to camp. The camels with few exceptions bore the journey excellently, and were well fed. The country traversed was for the most part covered with mulga (*Acacia aneura*), saltbush (*Atriplex nummularia*), and grass, and a large part of it might be utilised for grazing. We passed hills, mountains, and tablelands, and also discovered a belt of auriferous ground, as well as two large creeks skirted with *Eucalyptus* and several salt lakes, two or three of which seemed to be permanent. Everywhere the country showed the effects of continued drought, with half-dead mulga and saltbush; but during the latter part of the time heavy showers of rain fell, so that the western part of Central Australia could then have been crossed without difficulty. It is to be regretted that the Elder Expedition has come to an end." As Mr. Lindsay advanced from the Everard ranges to the so-called 90-Gallon Rock Hole, in about 27° 40′ S. lat. and 126° E. long., the distance between his furthest point and that reached by Mr. Wells from the west is not considerable.—*Deutsche Rundschau*, Jahrg. xiv. Heft 12.

The Kei Islands.—On p. 96 of vol. vii. it was announced that Heer H. O. W. Planten had completed a survey of the Kei group. His map is now drawn, and a copy is published in the *Tijdschrift van het Nederl. Aardrijksk. Genootschap*, Deel ix. No. 5, on the scale 1: 150,000. In the article which accompanies it are some geographical details which are not given in the note in vol. vi. p. 385. The name Kei may have arisen from the Portuguese *cayos*, meaning rocks or reefs, or from the expression very common in the mouths of the inhabitants, "*Kei wait*," *i.e.* "Don't know." The native name is Evaf or Evar (pigs), and is probably due to the number of wild swine found in the islands. While Nuhu Roa, or Little Kei, and all the other islands lying to the west of Great Kei, or Nuhu Yut, are exclusively of post-Tertiary formation, the latter island was formed in the Tertiary period, its oldest limestones containing corals which mark them as deposited in the Miocene age. Natural products are not abundant, but the woods contain several good kinds of timber. The inhabitants, who, as nearly as could be ascertained in an enumeration taken in 1890, number 23,253, cultivate sago, oil-palms, maize, and various fruits. Palm-oil and *copra* are exported. Great Kei differs from the rest of the group not only in its geological formation, but also in its configuration, being a mountainous land with many distinct summits, whereas Nuhu Roa is low and flat, with only one small elevation. On Great Kei the kangaroo occurs, as well as parrots, butterflies, and other forms not found on other members of the group; its flora is also different. In form the island is long and narrow, having a length of 54 miles and a maximum breadth of $5\frac{3}{4}$. The northern half is the broader, and is occupied by chains of mountains which culminate in the Daab, 2627 feet high. Further south the mountains run nearer to the east side, and become lower, until, having passed the narrowest part of the island, where they are only 300 to 500 feet high, they rise again in the Morbait to an elevation of 2202 feet; once more they gradually sink to the range of hills, 300 feet high, which terminates in Cape Veduar. A number of streams descend from the mountains to the east and west coasts, but most of them are dry during the east monsoon. The whole island is clothed with luxuriant vegetation, consisting on the steep slopes and mountain summits of impenetrable forest, which on more sloping ground gives place to plantations. The coasts are high, steep, and rocky, leaving here and there a strip of sandy shore, 300 to 500 yards broad, where the villages are built. Promontories are so numerous that the natives reckon distances along the coast by the number of capes to be passed. The island is almost entirely surrounded by coral reefs. On the east coast they are two to three hundred yards broad: on the west they are in some places as much as 1600 yards in breadth, and lie much further from the shore, enclosing a number of islets. On this coast a vessel can anchor during the east monsoon nearly anywhere within the reef, in twenty or thirty fathoms of water.

All the islands to the west of Great Kei, with the exception of the Taiandu and Kur groups, are included in the name Nuhu Roa. They are separated from Great Kei by a strait $4\frac{1}{2}$ miles wide at its narrowest point. The two principal islands have no distinctive names. They are formed of coral limestone, and in many places old strand-lines show that upheavals of the land have taken place. Streams are rare, and the inhabitants procure water, which is often brackish, by digging pits. The coasts are deeply indented by numerous inlets, and are in general rocky. As already mentioned, the surface is flat, the highest elevation being only 366 feet.

The Taiandu group consists of a number of islands, all of coral formation, covered with dense vegetation, and surrounded by extensive reefs. They are hilly, but of no great elevation, the highest point being 558 feet. The Mohammedan

population, numbering 1260, live prosperously. The men build *prauws*, while the women and children bake pots and pans.

Heer von Planten describes fully the coasts and channels of these islands, and gives a short description of the natives, their manners and customs, promising fuller details in a future article. Some information regarding them has already been given in vol. iv. p. 497.

MISCELLANEOUS.

Captain E. Kling, the successful explorer of the Togo territory, died in Berlin, on September 15th, of Tropical fever, at the age of 38 years.—*Globus*, Bd. lxii. No. 15.

The Anglo-Portuguese Delimitation Commission has discovered that the **plateau of Manica** has no existence. It has, therefore, been decided that the meridian of 32° 30′ E. shall be the frontier.—*Mouvement Géogr.* No. 20.

A **telegraph cable**, 2060 nautical miles in length, has been laid between San Francisco and Honolulu. Another is being laid from Pernambuco to St. Louis on the Senegal, a distance of 2165 English miles.—*Deutsche Rundschau*, Jahrg. xiv. Heft 12.

On May 27th the **Gilbert Islands** were annexed to the British Crown by Captain Davis of the *Royalist*. On the **Gardner, Danger, and Nassau** islands the British flag was hoisted in July by the *Curaçoa*, and in the same month the *Champion* took possession of **Johnston** (Cornwallis) Island, to the south-west of Hawaii. The last is uninhabited, but is rich in guano, and its lagoon affords good anchorage.

Captain Richard has hoisted the French flag on the **Glorioso Islands**. They are three in number—Glorioso, Ile du Lys, and Ile Verte, and lie about 160 miles from the Comoro Islands, and as far from Diego Suarez. The same vessel was afterwards sent to take possession of **St. Paul and Amsterdam** islands, about 10 degrees north-north-east of Kerguelen.—*Revue Française et Exploration*, September 1st.

The Imperial British East Africa Company being unable, in the present state of communication, to continue the occupation of **Uganda**, Lord Rosebery has intimated that Her Majesty's Government is prepared to contribute towards the expenses of occupation for a period of three months, up to March 31st. With regard to the future the Government reserves to itself perfect freedom of action ; but it is to be hoped that at the end of the three months some measures may be taken to protect Uganda from the anarchy into which it must fall if abandoned by Europeans.

The Central Sudan is dotted over with numerous towns with large populations, and the greater part of this region is continually traversed by caravans of Hausa, the leading commercial people of Africa. It is estimated that at least one-hundredth of the human race speak the Hausa language. The study of this language is therefore of great importance to philologists, traders, and missionaries, and, accordingly, the **Hausa Association** has been formed with the object of obtaining a complete knowledge of the language, and making a translation of the Scriptures into that tongue. The Rev. J. O. F. Murray, Dean of Immanuel College, Cambridge, is honorary secretary, and Mr. J. H. Tritton, honorary treasurer. Lord Aberdare and Sir G. Taubman Goldie, of the Royal Niger Company, the Archbishops of Canterbury and Dublin, and a number of well known representatives of science and philology, are members of the Committee.

The above Association now invites applications for a **Robinson Studentship** of the value of £200 per annum. The student will be required to devote himself to the study of the Hausa language and people, at first in Tripoli, and afterwards in the interior. Applications addressed to the Rev. J. O. F. Murray will be considered at a meeting to be held on December 2nd.

NEW BOOKS.

History of the New World called America. By EDWARD JOHN PAYNE, Fellow of University College. Volume I. Oxford: At the Clarendon Press, 1892. Pp. xxviii + 546.

Mr. Payne has entered on a vast undertaking, and the character of this first volume makes it seem all the vaster. A volume of 546 pages still leaves us at aboriginal America. Mr. Payne, wisely perhaps (that he may not restrict or impede himself), throws out no indication of how many such volumes must follow. To us it appears difficult to maintain the proportion which must now be observed, if the work is to be consistent and a unity. But we have to thank Mr. Payne now for a volume which is interesting, which displays close investigation and much solid and wide learning, and is remarkable for acute observation and inference.

Mr. Payne's task is "to restore, if possible, the true features of the advanced communities of the New World, to analyse their social structure and economy, to measure by some definite standard the degree of progress they had attained, and to trace their history, so far as it can be traced, distinguishing what can fairly be accepted as fact from what can be shown with reasonable certainty to be fabulous." It is impossible for us to follow Mr. Payne through this volume, which is naturally made up of rather miscellaneous matter, though written with a fairly definite purpose: be it enough to point out one or two respects in which the treatment or the views advanced contain something of novelty or of special value, and to conclude with a rather general criticism of Mr. Payne's style and method.

The first book traverses the Discovery of America; the second, Aboriginal America. Both are very exhaustive: there are, indeed, in our view, too many side references, too much chiefly illustrative matter. The discovery of America is tersely described as "the lever which overthrew the old cosmography." Three processes are enunciated as involving, each of them, this discovery: (1) "General enquiries into the geographical relation of western Europe to eastern Asia," following upon the Greek discovery of the sphericity of the earth, acted upon from the time of the Pythagoreans, with new vigour under the Roman Empire, and, after the neglect of the Dark Ages, with still greater vigour since the thirteenth century; (2) "The gradual extension of northward explorations, from the North and Baltic Seas," by way of Iceland, Greenland, and Labrador, a process beginning under the Romans, vigorously carried on by the Northmen, and resulting in the discovery of America more than four centuries before Columbus; (3) "The gradual extension of southward explorations, from the shores of the Mediterranean, among the island groups of the eastern Atlantic," a process beginning with the Carthaginians, renewed with the discovery of the Fortunate Islands by the Ancients, and, by reason of its cessation, precipitating the enterprise of Columbus. Each of these processes is fully detailed. The second book is of interest chiefly for the presentation and development of a theory. Mr. Payne finds the "great landmarks" by which man has advanced along the path from savagery to civilisation to be: (1) the substitution of an artificial for a natural basis of subsistence (pp. 276 *sqq.*); (2) the establishment

of the gods as the principal members of the community (pp. 433 *sqq.*). Following out the first part of this theory (which Mr. Payne promulgates in the belief that it is as necessary as it is novel), and applying it to the case of America, the author holds as proved the indigenous origin of its aboriginal condition, inasmuch as (to adopt a summary) the llama and the paco, the potato, the manioc, and the maize, which are indigenous to the New World, were unknown in the Old, whereas the corresponding bases of agriculture and herdsmanship in the Old World were as much absent in the New. Alike by the general reader and by the specialist probably no part of Mr. Payne's work will be more welcomed than his elaborate examination of the religion and worship of aboriginal America. The subject has already received considerable attention ; but Mr. Payne has succeeded in introducing new facts and overthrowing old views.

Mr. Payne gives some indications of his conception of American history and of his method in dealing with it, on which it is permissible to offer a remark at this early stage of his labours. The task, though vast, may be exaggerated ; to this we have already referred, and we will now only express the hope that Mr. Payne will complete a standard history of a great subject, or (shall we say?) series of subjects. But the nature of the task, also, may be obscured. We are told that America has become "a new and a greater Europe" (p. 8), that the history of America is the Epic of Europe ; *not*, however, in the sense of "large and definite political combinations," which is just apparently what the author means to claim. But, again, later on, Mr. Payne tells us that exclusively European causes are insufficient "to account for the direction assumed by the general lines of American history when it is attempted to trace it from the Discovery as a starting-point" (p. 245). We may regard this expression of Mr. Payne's view as complementary to that just given. It does contain a truth such as in our insular or race pride we are too apt to ignore ; yet it is not amiss to suggest that the effects of conditions and causes existing anterior to European influences may easily be exaggerated, especially under conformity to a theory. We will not anticipate Mr. Payne's subsequent treatment of his theme ; but it is possible to be too novel, to search too far, after Buckle's style, for a science of history in all things, and to counteract the result of deep research by too ingenious theorising, such as that very research, and adherence to fact based on it, should be a potent factor in dispelling. But there will be opportunity in plenty for the exercise of that power of weighing and distinguishing causes which Mr. Payne possesses and delights in ; for no one contends that America is a unity, when even single states of the great American Commonwealth may be found by the investigator, in spite of outward institutions and symbols held in common, to be full of diversity of custom and of tendency.

A collection of maps in illustration of the broad historical conditions and results of which Mr. Payne will have to write from epoch to epoch will, we hope, be forthcoming in succeeding volumes.

Travels in Africa during the Years 1882-1886. By Dr. Wilhelm Junker. Translated from the German by A. H. Keane, F.R.G.S. Illustrated. London : Chapman and Hall, 1892. Pp. viii + 586. *Price* 21*s.*

For more than one reason this, the third and last volume (for notices of the first two see vols. vi. p. 442, and vii. p. 509), of Dr. Junker's travels, surpasses in interest its two forerunners. In the first place, it contains the record of the crowning achievement of his long years of African wandering—the virtual solution of the Welle-Makua problem. In the next place, the concluding chapters describe the eventful but anxious months during which Dr. Junker was detained beside Emin Pasha in the Equatorial Province, owing to the successes of the Mahdists on

the Middle Nile. But there is yet another circumstance, one of a melancholy and sorrowful, not to say pathetic, character, that makes this volume, in a very pregnant sense, peculiarly interesting. The single-minded gentleman—for Dr. Junker must have been emphatically a gentleman—who gave so many years, with such singleness and earnestness of purpose, to the accomplishment of most valuable work in an unknown part of the world, had scarcely laid aside his pen from correcting the records of his noble labours, when death, as if begrudging him further fame or pronouncing that his complement of utility was achieved, removed him. We cannot forbear quoting Dr. Keane's sober, but certainly just and truthful, tribute to his work and character as an explorer in the bewildering maze of Central Africa. "Dr. Junker will always be regarded as a typical scientific explorer worthy to rank with such men as Barth, Wallace, Schweinfurth, or Bates, . . . during all his ramblings in the Welle-Congo and Upper Nile lands he appears to have never directly or indirectly occasioned the loss of a single life. [A most notable thing to say!] Like Livingstone he moved about alone amongst the natives without armed escorts, and accompanied only by his attendants and carriers. His ethnological studies of the populations about the Congo-Nile waterparting are of the first importance." Unfortunately, his very extensive collections of ethnological as well as zoological objects were mostly lost amid the political confusion produced by the followers of the Mahdi; still, something was saved, enough to enable us to realise the extent of the loss that adverse circumstances have entailed upon us.

The regions principally described in the first portion of the volume are those that lie chiefly in the western basin of the Welle-Makua, the furthest territories to which the Sudanese officials of Egypt had extended their sway; though at the time of Dr. Junker's visits they had lost, or were rapidly losing, their hold upon them. The explorer seems to have travelled, during a part of his itinerary, in the footsteps of Dr. Potagos, whose information he takes more than one opportunity to correct. These early chapters treat of several Zandeh chiefs and peoples, to whom Dr. Junker gives a uniformly higher character than to the Mangbattu (Monbutto), and contain interesting accounts of a servile race called the A-Kahle. In the later chapters we can trace the progress of the Mahdist movement, and can read how Lupton Bey struggled against his fate in the Bahr-al-Ghazal province, and what steps Emin took to keep the Equatorial Province, and to preserve the trust that had been committed to him. One passage we have read—we frankly confess it—with genuine distress; it runs thus: "Buru's son assured me that he knew for certain that Mambanga [a Zandeh prince] *had been secretly shot* by order of Emin Bey. . . . I could not believe it till it was confirmed to me in Makaraka Land, and later from Dr. Emin's own mouth (p. 301)." No wonder Dr. Junker, who looked upon Emin Pasha as his friend, adds immediately afterwards, "I confess that this grievously affected me," as it must all who have followed with admiration Emin Pasha's efforts to spread enlightenment and establish habits of good government in the Upper Nile lands.

The book is well and most profusely illustrated, and an engraved photograph of Dr. Emin Bey forms its frontispiece.

Up the Niger. Narrative of Major Claude Macdonald's Mission to the Niger and Benué Rivers, West Africa. By Captain Mockler-Ferryman, F.R.G.S. F.Z.S. With Maps and Illustrations. London: George Philip and Son, 1892. Pp. 326. *Price* 16*s*.

The Royal Niger Company, unlike its unfortunate sister-company in East Africa, or the enterprising Chartered Company in South Africa, has been long

established, and has successfully overcome the initial difficulties of consolidation. The obstacles it has broken down have been no less, but rather greater, than in the healthier and less-settled parts of Africa. The secret of the success of the Niger Company is that its affairs have been administered by practical and competent men, who have had the insight and courage to recognise and fight against the real difficulties of their position. These difficulties, common to all similar undertakings in Africa, but especially complicated on the West Coast, are mainly of a commercial character; and the distinctly commercial administration of the Royal Niger Company has resulted in its being able to pay 6 per cent. on the invested capital. Commercial success in Africa implies also political success, by providing the means to that end. The Royal Niger Company, under the able direction of Sir George Taubman Goldie and his coadjutors, has not been behindhand in its efforts to secure to the Empire the most valuable lands and markets in West Africa; it has, without any public parade, obtained jurisdiction and pre-emption over a vast colonial possession. The ordinary machinery of government erected by it has proved successful in the maintenance of law and order, and capable of checking or chastising native aggression or lawlessness. As for the charges of its detractors, these have been met and confuted, and in no place more effectively than in the book before us. To the Company has fallen the difficult tasks of stemming the advance of Islam southwards, of protecting the Pagan tribes against enslavement, no less than of eradicating barbarous native practices, and of holding even the balance of justice between rival European enterprises.

Major Macdonald having been appointed Her Majesty's Commissioner in that part of Africa—a very necessary and judicious step—was commissioned by the Colonial Office to inquire into the administration of the Royal Niger Company, and into the validity of its claims over native territories. Incidentally, Major Macdonald had other objects to carry out: such as to induce the Ilorins to make a treaty of peace with the Ibadans; but with these we need not concern ourselves. It redounds greatly to the credit of the Company that, after a most careful and thorough investigation on the spot, Major Macdonald was in a position to speak most favourably (according to Captain Ferryman, his private secretary and author of the narrative) of the position of affairs in the Niger-Benué basin. The British Commissioner ascended the Benué up to and beyond Yola, and the Niger (or Kworra) as far as Rabba; several inland expeditions were, moreover, undertaken at different points on the journey. The Company's stations were found to be in good working order, and the native chiefs to have been honourably treated; no hostile obstacles were encountered, and the facilities of transport were everywhere fairly adequate.

The most interesting portion of Captain Ferryman's narrative is, undoubtedly, that dealing with the ascent of the Kebbi river, the highest known tributary of the Benué; but we do not think that the author establishes the fact of any water-parting (probable as it may be) between the Tsad and Benué catchment-basins. Untoward circumstances prevented the party, in a light-draught, stern-wheel steamer, but provided with a boat, from reaching the Tuburi Swamp, between which and the two catchment-basins some hydrographical connection may possibly exist—since nothing has been proved to the contrary—though, it is true, the likelihood of a continuous navigable waterway is more than improbable.

Captain Ferryman has written an interesting and instructive narrative; but we must be allowed to disagree with his imperfect estimate (though it is modestly advanced) of the commercial resources and prospects of the Niger basin. In our opinion, owing to the circumstances now existing, the Niger basin, as a political

and commercial unit, is the most valuable and hopeful of any British possession in Tropical Africa, in spite of adverse conditions of climate.

A chapter on native musical instruments is contributed by Captain C. R. Day; and there are some appendices. Mr. Ravenstein's map is clear and trustworthy.

Cinq Années de Séjour aux Iles Canaries. Par le Dr. R. Verneau, Chargé de Missions Scientifiques. Ouvrage illustré de 42 gravures, 4 planches, et 1 carte. Couronné par l'Académie des Sciences. Pp. xvi+412. Paris: A. Hennuyer, 1891.

This is a work of much more importance than any of the recent books on the Canary Islands, being the result of several years of study and observation. It combines, in fact, the solid information which characterised the older writers, as Webb and Berthollet and von Buch, with the ordinary experiences and adventures of the average book of travels.

After an historical introduction, beginning with the Hesperides and the Phœnicians, the author gives an elaborate summary of all that is known or reported of the ancient Guanche inhabitants who were found there by the Spaniards, of their social and political organisation, of their mental and moral qualities, and (where he is, perhaps, on firmer ground) of their arts, dwelling-places, and sepulchres. On the subject of their language, which has been lately a good deal discussed, he does not consider that we are in a position to dogmatise, but personally he inclines to the view that they are connected with the prehistoric 'Cro-Magnon' race, and akin to the modern Berbers. The contents of the tombs and dwellings do not give such certain information as might be expected, since they consist occasionally of remains of other races besides those which we call Guanches —notably of some Semitic invaders. And it seems that the old grotto tombs are occasionally used even at the present day in out-of-the-way districts, to save the trouble of a long journey to the orthodox burying-place. The actual race is, of course, composed of various elements, and at Tirajana, in Grand Canary, according to the author, may be observed, besides the original Guanche type, the North African, the Negro, and the European.

Dr. Verneau describes each island in its turn. All up to a certain point are similar in character, but some have suffered much more from the later volcanic eruptions than others; some are much better supplied with water than others. Accordingly, Fuerteventura, with its covering of sand and lava, and its droughts lasting for years together, maintains only seven people to the square kilomètre, while Grand Canary has 65, and Tenerife 53. Of the last two, Grand Canary is the most favoured, having, as the author calculates, 13 cubic mètres of water daily for each person, while Tenerife has only one. The people he describes as fervent Catholics, extremely superstitious, having the primeval savage's dread of parting with any of his hair, or being measured, or having his portrait taken; they are very dirty, but the scarcity of water is some excuse for this. They seem to be honest, amiable, and obliging in proportion as they are free from mixture with European blood; and in many districts, the writer says, the admixture of European blood is practically non-existent. Their dances and other customs in such places are identical with those reported to have existed before the conquest. The writer records many striking instances of the ungrudging, gracious, and disinterested hospitality which he met with; many hairbreadth escapes, too, in exploring the grottoes which constituted the dwellings or tombs of the early race. We note an occasional omission, as in his description of the public institutions of Laguna, where he does not mention the College or the Library. But the work does not

profess to be a guide-book, though it is one which every one should read who intends to visit these islands.

Studies in Mohammedanism, Historical and Doctrinal, with a chapter on Islam in England. By JOHN B. POOL. London: A. Constable and Co., 1892. Pp. xvi + 420. *Price* 6*s.*

This volume will be found both interesting and useful to the general reader, as supplying in a convenient form a very good outline of the rise and development, with an account of the more salient features, of the Mohammedan religion. There are short chapters also on the Turks, Afghans, Corsairs, crusades, literature, architecture, slavery, etc., which convey much popular information in a pleasant style. The word *Studies* on the title-page might perhaps repel some from the reading of the book, but it is not to be understood in the technical sense: there is no deep research or thought manifested in these chapters; they give a clear and accurate representation of the salient points in the history of the religion of Islam—such as is an essential preliminary to any scientific *study* of it. It is really what its author calls it in his preface, "a popular text-book on the wide field of Musulman faith, practice, and history;" and it is written from a Christian but candid point of view.

Many will be interested in the chapter on Mr. Quilliam's attempt to establish a hybrid sort of Mohammedan sect at Liverpool. From this chapter (pp. 394-403) and the preface it seems the attempt has not had more success than many other equally wild schemes of these days, when some seek rather to gratify a prying, if not impertinent, curiosity respecting divine mysteries than to understand what is connected with human duties.

Sicily (Story of the Nations): Phœnician, Greek, and Roman. By EDWARD A. FREEMAN, M.A., Hon. D.C.L., LL.D. London: T. Fisher Unwin, 1892. Pp. xvi + 378. *Price* 5*s.*

Not many words are needed to notice Mr. Freeman's posthumous volume on Sicily. It was a maxim with him that "to write a small history you must first write a large one;" and we have already noticed in these pages the published volumes of Mr. Freeman's monumental history of Sicily. The merits of those volumes appear in the present one; their slight defects (such as digressions and an excess of comparative allusions) have almost disappeared. The result is such a connected view of Sicilian relations as hardly any have hitherto been able to command; and we must all regret that the great historian has not lived to interest us in that period of Sicilian history, the Norman, which he had been working at so long, and to which he himself was chiefly drawn; but we trust that the materials, already collected for this purpose, according to the preface, will be judiciously handled, and that we shall have at least a valuable fragment. No more important contribution has been made to this series of the "Story of the Nations" than this volume on Sicily, the "meeting-place" of many nations, the home of none. The illustrations are many and excellent.

Afrikanische Petrefakten. Ein Versuch die grammatischen Bildungen und Formwurzeln der afrikanischen Sprachen durch Sprachvergleichung festzustellen. By A. W. SCHLEICHER. Berlin: Theodor Fröhlich, 1891. Pp. 93.

In this short treatise Mr. Schleicher has tackled a very abstruse and obscure question of philology and ethnology. Some have attempted to demonstrate the connection of the Shemitic and the Aryan families. Others have endeavoured to define the affinities of the Shemitic and the Hamitic groups or families. In 1880, in the introduction to his *Nubische Grammatik*, Lepsius summarised these

studies in their ethnological aspect, and further tried to reduce to some sort of order the crowd of African languages. Competent judges will probably consider the question not yet ripe for solution; but Mr. Schleicher has boldly tackled it. His enterprise is admirable. Starting from the position of Lepsius he discusses the "wandering of the peoples" into Africa, and within it, at different periods. He commenced with the study of Somali, added to it some of the Bantu family, and has since made a comparative study of the whole African field. The result of his study is that the Shemitic, and the vast majority of the African languages, have one and the same grammatical structure fundamentally. The apparent differences are due to diversity of disposition of the radical elements which are common to them all. Before he concludes he addresses Shemitic students, and tells them that their "salvation" lies in the study, first of the Hamitic, and secondly of the Bantu languages.

Mr. Schleicher is a specialist in the study of Somali. We shall welcome a sound and profound work on it from him. We shall be interested to see the position he assigns to it. Meanwhile, he will forgive a critic in a Scottish magazine of geography for viewing his general theory with considerable caution. We have here, some of us, not yet quite recovered from the crazy fudge of some deceptive Aryan theories. And in these discursive studies furth the pale of history, in such a palæontological study of race and speech as here under review, which is partly speculative as well as comparative and historical, the ardent student is very apt to commit cerebrative vagaries.

Die Triangulation von Java, ausgefuhrt vom Personal des geographischen Dienstes in Niederländisch Ost-Indien. Dritte Abtheilung. Von Dr. J. A. C. Oudemans. Haag: Martinus Nijhoff, 1891. Pp. 180.

The first part of this work dealt with the testing of the base-measuring apparatus made by Messrs. Repsold & Sons, which was completed in 1871. This was accompanied by a normal mètre and measuring rods consisting of bars of steel and zinc placed side by side. All these were compared with one another and with three standard mètres. In the second part, published in 1878, are described the ground chosen for a base-line, which was at Simplak, a few miles from Buitenzorg, and the whole process of measuring the base. The length obtained, after corrections and reduction to sea-level, was 3887·71 mètres. In 1872, however, the standard mètre of platinum and iridium, which was to be furnished by the French Government in accordance with the resolutions of the Conference of 1872, had not been received in Holland. We find, then, in the third part, the comparison of the normal mètre of Repsold with the new standard, resulting in a reduction of ·0142 mètre in the length of the base. Then follow the construction of a primary triangle at Simplak and measurements of bases at Logantong, in central Java, and at Tangsil, with the construction of their primary triangles. All the observations are recorded in tables, and the corrections are worked out. The book contains the results of a vast amount of labour, and will be a useful record for future surveyors in Java; but of course it has no interest for the general reader.

Das Verebnen der Kugeloberfläche für Gradnetzentwürfe. Von Dr. A. Breusing. Leipzig: Verlag von H. Wagner und E. Debes, 1892. Pp. 69. *Price* 3 *m.*

The processes by which the network of longitudes and latitudes, as derived from some of the principal projections, is constructed, are clearly described in this little book. It seems to us, however, that in a work intended to be used as a text-book, the conical projections, from which so many maps are drawn, should be described, whatever personal objections the author may have against their use. Again, Dr. Breusing's argument against the treatment of perspective projections

as such is not convincing. He speaks from his own experience of the difficulty pupils have of grasping the idea that in the Stereographic projection the eye is supposed to look at the under surface of the globe from the other side, and that from this point of view points on the right side of the central meridian appear on the left ; but, surely, to one who has learned sufficient plane and spherical trigonometry to understand this book, the task would be easy. However this may be, the construction must be the same, and the perspective view puts in a clear light the mode of development. Too much space is devoted to historical notices and questions of nomenclature in a work that purports to be a *Leitfaden für den Unterricht*, and much of this space is wasted, for the titles "Orthographic," "Stereographic," and "Gnomonic" or "Central" are too firmly established to be ousted by such expressions as "reifentreu," "winkeltreu," and "geradwegig," and, though the projections known as Flamsteed's, Bonne's, etc., may not have been invented by those cartographers, it is now too late to re-name them. We cannot quite agree, either, with Dr. Breusing in the advisability of always using German words. Those derived from Greek and Latin have not only the advantage of being the same in many languages, except for slight alterations in their terminations, but they have also a specialised meaning : "gravity" (in German "Gravität") is much preferable to "Ziehkraft." Nor do the German terms (or English) always explain their meaning. Would a German at once perceive that Dr. Breusing's "Stuhleck" meant a trapeze ? The diagrams at the end of the book are numerous and well executed.

Appleton's General Guide to the United States and Canada. Illustrated. With Railway Maps, Plans of Cities, and Table of Railway and Steamboat Fares. Edinburgh : A. and C. Black, 1892.

This is the English edition of the guide to the United States and Canada issued by D. Appleton and Co., New York. As it has been "printed in America," it must be taken as an example of the practical working of the new Copyright Act lately adopted in the United States. It is of course copyright in America, being printed from types set up there ; and no doubt Messrs. A. and C. Black have taken the necessary steps to secure copyright in this country also. As it is a portly volume of upwards of 600 pages, printed for the most part in small though clear type, there is obviously ample room and verge enough for detailed information ; and in respect of fulness and minuteness of detail the book leaves nothing to be desired. The lists of hotels, restaurants, modes of conveyance, churches, places of amusement, reading-rooms, art collections, and clubs are exhaustive even to perplexity. The descriptions of scenery and of public buildings are simple, straightforward, and in good taste. The suggested routes, of which there are 133, are well planned, and cannot but be helpful to the traveller. With this book in his hand the visitor can have little difficulty in selecting the objects and the scenes that are best worthy of his attention. That Canada has received scant justice in comparison with the United States is perhaps only what might have been expected in the circumstances, but enough is said about the Dominion to justify its inclusion in the title-page. It is to be regretted, at the same time, that there is no general map of Canada, when plenty of room for such a map could have been found in the pocket at the end of the volume. The ground-plans of the great cities—New York, Philadelphia, Boston, Chicago, Cincinnati, St. Louis, and others—form one of the most striking features of the book. A copious index adds greatly to the value of the *Guide*, which, apart altogether from its utility to travellers, forms an interesting compendium of the present state and the commercial resources of the great Western continent.

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Miete R.
Chipomuwa R.
Gold
Katusa
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Undi
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Ichidondo
(Kimgwaru)
Tsa Kali
TERRITORY
Micombo
Lowugwe River
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Gold
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(Old Workings)
Gold
Namasi R.
Chiritsi River
Kapochi River
Karumbi
Chausa V.
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Lwin River
Ngandjo
Zuzi Mt.
Mandji
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River Zambesi
Acabababassa Falls
Massunangwesi
Mavezi R.
Piri M
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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

ANNIVERSARY ADDRESS.

(*Read at Edinburgh, November 15th*, 1892.)

CHARACTERISTICS OF AFRICAN TRAVEL.

With Notes on a Journey from the East Coast to the Albert Lake.

By Captain F. D. Lugard, D.S.O.

My Lord Duke, Ladies, and Gentlemen,—To read an inaugural address before the Royal Scottish Geographical Society is a privilege of which I feel myself unworthy; and though I am deeply sensible of the great honour your invitation confers on me, I fear that I can only offer in return a few commonplace and wholly unscientific remarks, for which I must beg your indulgence. I am invited to read a paper on African travel, and I think it may be of interest if I give you a few brief details of the way in which travel in British East Africa is conducted.

To many people in England Africa is still a great dark continent—the continent of our childhood, when we pictured the vast interior as something between a Great Sahara and a vast swamp: a land of naked and fierce savages, of pestilential malaria, of savage beasts with ferocious appetites. Simooms and siroccos, crocodiles and puff-adders, obtrusive lions, inquisitive gorillas, are jumbled up in a kaleidoscopic confusion; and so we African travellers who have emerged safely out of all this supposed tangle of dangers are credited with all sorts of qualities dear to our self-love, but hardly merited. Many readers, whom I have met, of that admirably written book of Professor Drummond's, *Tropical Africa*, have asked me,—"Is it true that there are paths everywhere throughout Africa?" It was a revelation entirely incompatible with the Sahara and swamp idea of Africa. But the Africa of reality is a very different thing, especially at the higher altitudes. From Kikuyu to Kavirondo you will pass over a plateau from 6000 to 10,000 feet high, where in places you will see soft, springy turf like an English lawn. You will see the forget-me-not, and clover, and jessamine; you will feel the nettle, and bramble, and Scottish thistle. Evergreen bushes of very many kinds abound, and

the scenery is that of Europe. Rushing streams and sheltered bays of lakes afford the same picturesque glimpses of scenery you will find in Scotland, and as you scale the hills with the cold wind in your teeth you will feel the same bracing atmosphere. Further north, in Somali-land, or from the Red Sea littoral, travelling is a matter of camel-convoy and armed escorts; further south, of canoe and boat-work along rivers and lakes, with local carriers at certain points.

After deciding on starting for the interior, the first step is to engage porters to carry your loads. These probably number 200 at least. They carry loads of 60 to 70 lbs., generally on their heads—often on their shoulders. The loads will consist of your personal kit, tent, bedding and camp necessaries, such articles of European provisions as are necessary to the traveller, some spare ammunition for your men, sporting ammunition for yourself, and a variety of goods for barter with natives in exchange for food for your men. These goods are mostly cloth (calico and a common drill), beads of various sorts (for each district and tribe has some particular kind which alone it will take), iron and brass wire, and some miscellaneous odds and ends for presents. Having inquired from those who have a knowledge of the matter, and then bought your goods, you issue the loads to your men, and each one carries the load now given to him throughout the march, or till it is consumed. Though you may have 100 boxes or sacks all exactly similar, each man will know and daily select his own, and will seem to get an affection for it.

And now, having issued to your men their day's food, and, perhaps rations for a day or two in advance, having appointed your headmen and your *Askari*—these latter are men who carry no loads except under stress of circumstances, and who perform all the miscellaneous duties of camp—you start from Mombasa, the porters singing and shouting, with their gay-coloured cloths, bought out of the preliminary advance of three months' wages. The land immediately behind the coast-line is very hilly, and is covered with acres on acres of cocoa-nut palm, cashew-nut, mango trees, and crops of various grains, oil-seeds, etc. These estates belong to the wealthier Arabs and Swahilis of the coast. At the first streak of dawn we are up, and an hour later we are on the march. The path, though it is full of endless little kinks and turns, nevertheless leads very directly to its goal, and is as a rule good. High grass and jungle bushes lean over it, and sometimes meet overhead: if you are leading the way in the early morning, the heavy African dew, which weighs down each leaf and blade of grass, will give you a cold douche, wetting you in five minutes to the skin. Not till the sun is high in the sky does the dew evaporate. An hour's march, perhaps two, and then a halt for a rest, until the laggards and sick come up; another similar spell and, on an ordinary ten or twelve mile march, we are in camp. With a rapidity which it would take a smart regiment with Indian experience to beat, the tents are up and the loads stacked, while the porters are already busy with their arrangements. Each little camp, of at most ten men, forms a separate community for mutual assistance. One fetches thin wands, another grass, another bark to tie, while a fourth constructs the common hut for the night out of these materials with marvellous rapidity. Others

forage for food, and barter their little store for the ancient village fowl; others are collecting firewood, others drawing water. And so, as night falls, you will see blazing fires all round, the common cook-pot on the fire, scrutinised by a dozen hungry eyes while the stiff porridge meal is slowly stirred round with a wooden spoon a yard long by the deputed cook of the community. Possibly we have passed game to-day, and zebra or hartebeest, buffalo or giraffe, has fallen to my rifle. If so, the voices and the laughter will be louder; and when my headman blows his boatswain's whistle and shouts to the heads of camps to know if all are present and safe, you will hear a lusty clamour of thanks and uncivilised happiness which will double your pleasure in the result of your bag.

And who are these same happy, careless, childlike Zanzibaris? They belong to as many Bantu tribes as there are in Africa, but the most numerous and the best are Wanyamwezi and Manyema. I say the Bantu tribes of Africa, for these alone possess the enormous physical power required for porter work. The characteristics of the Bantu races are those of the West African Negro modified. A flat and boneless nose, woolly head, thick lips, and very dark skin, with a wonderful physique and great muscular power, are their typical characteristics. The remaining tribes of British East Africa are of a totally different origin, and of a radically opposite type. Of this class the Somalis, Gallas, and Wa-huma are noteworthy: they have high foreheads, sharp-cut features, often large and aquiline noses, light-coloured skins, soft wavy hair, and very sinewy frames, adapted to walking or running great distances, but not to feats of brute strength. The Bantu are mainly agricultural and settled, the others pastoral and nomadic.

Leaving the belt of coast cultivation behind us, and with it the hills of Rabai and the last traces of civilisation, we enter the land of the Wa-nyika, "inhabitants of the desert," the tribe of the Wa-daruma. They are a people for whom I have no liking, but perhaps my experiences with them have been unfortunate. To me it has seemed as though their one aim was to carry down to the toddy-palm groves of the coast the grain cultivated in their fields by their hard-working women, and there, exchanging it for fiery liquor (*tembo*) made on the spot from the unripe cocoanut and sold by the *Shamba*[1] slaves, to spend their days in drunken sottishness till liquor failed them. The degradation of the tribe, bumptious and conceited, though feeble in war, has been wrought by its proximity to the fatal *tembo* of the coast. Cattle they at one time possessed, but the plague and the Masai have carried them off, and large flocks of goats form now their only wealth. Their villages are strongly stockaded, and the large areas under cultivation attest their industry, or, rather, that of their women.

Beyond the Wa-daruma—travelling by the best-known route—lies the Taru desert, a wilderness of low thorn jungle stretching away to the horizon. Great granite rocks appear on the surface, and often (as at Taru) contain huge water-worn cavities four or five feet deep. These water-

[1] *Shambas* are "estates" varying from a field to a district. Slaves employed in the cultivation of these estates are termed "Shamba-slaves."

holes are a singular phenomenon, seeing that the country shows so few other signs of the action of running water. Through scores of years, perhaps centuries, the stone which had found its lodgment in a hollow of the rock must have ceaselessly revolved round and round under the impulse of an eddying whirlpool of water, wearing for itself a cavity larger and larger and deeper and deeper, with perfectly rounded and smooth sides. And now the rock forms part of the waterless plain ; the very stone which wore the strange hole is often still to be seen, and the cavity worn by ages of water-action is now the sole storage for water in a waterless country. Strangest of all, it seemed to me that these water-holes at Taru were not in the bed of a stream, nor even on the low-lying ground, thereby indicating a complete change of configuration as well as of climatic conditions. But Taru is not a paradise that we should linger there. Passing through the wilderness of thorny scrub by the similar water storage (generally dry in the drought) at Maungu, we come to the country of Taita, some 50 miles from Taru. The Wa-taita merit no special mention ; they are a harmless, feeble race, taking shelter in their rocky hills with their herds of goats from their more powerful neighbours, and glad to barter a little of their surplus grain to the passing caravan. Their country, too, is arid and parched-up in the hot weather ; water is very, very scarce, and fodder more than scanty. If you travel when the heat is greatest, you must make long forced marches of 20 miles and more at a stretch till you reach the first river, properly so called—the Tsavo, a deep, clear stream, always full, carrying down the snow-water of Kilimanjaro to the Sabaki and the sea.

The country beyond Taita is little better than that we have passed through ; though doubtless irrigation channels could be successfully led from the upper reaches of the Tsavo, and then this country might become a garden of cultivation. But, as it is, villages are few and very far between, and the country is given over to wild thorn growth and aloes, and is the habitat of the rhinoceros and antelope only. From Taru to Maungu an excellent road has been cut through the bush by the Company. And now, shortly after crossing the Tsavo, we strike a most excellent road, in course of construction by Mr. Wilson, of the East African Scottish Mission, under the auspices of Sir W. Mackinnon. I look on this road as a triumph, because it has been made almost solely by the labour of the local tribe—the Wa-kamba—the first and only successful attempt to induce the local tribes to undertake free labour. But I confess I regard it more in the light of a monument of what one man of indomitable energy and untiring perseverance can do, than as a sign of material progress among the Wa-kamba. I have never met a man who could handle natives with such singular success as Mr. George Wilson—a Scotsman, though an Australian by birth ; he wins from them a species of adoration. He was my own very valued second-in-command during the earlier part of my expedition, and from him I learnt lessons of tact with natives, and sympathy with them, which have been invaluable to me, and which I gratefully acknowledge. The Wa-kamba are good-natured, easy-going, thoroughly lazy, typical savages—no mean fighting men with their bows and poisoned arrows. They alone have

managed to retain considerable herds of cattle, now that the plague has destroyed almost every living ox from the coast to the Albert Lake, and I know not how far beyond, and much of the game besides. Primitive as the Wa-kamba are in their agricultural methods—a common instrument with them for ploughing the soil is a pointed stick and nothing more—I was surprised to find that a system of irrigation is practised by them. Nowhere else in Africa have I seen irrigation channels used, and they are here constructed with much skill and with admirable results.

Here, at the Kibwezi river, is a singular lava-bed. It is strange to picture to ourselves the time when this molten mass must have come down, a boiling and eddying wave of fire, from Kilimanjaro or Kenia, destroying the vegetation, the forest, and the villages, and leaving destruction and black smouldering desolation behind it. Even now the outline of each petrified wave is clearly to be seen; and the indications where one molten stream has flowed over another already partly solidified, eddying round with the fall of the ground, bring to our minds the more vividly how grand the sight must have been in those bygone ages when the mighty volcano discharged these living streams of fire. To-day forest and other vegetation cover for the most part the lava surface; and it must, indeed, have taken long ages to clothe with soil a surface so hostile to vegetation, and so little fruitful in soil-forming material. The cinders, and the sharp broken snags of lava, are a sore trial to the bare-footed porters. The little stream of the Kibwezi flows down the valley where once flowed the lava streams, and its water is clear as crystal—the best and the purest I have seen in Africa. Here, on its banks, you will see the neat grass houses of the Scottish Industrial Mission, founded by Dr. Stewart of Lovedale, and be welcomed with Scottish hospitality, and shown the plans in progress for the development of the Mission work.

From the Kibwezi we begin the gradual ascent of the higher lands of Central Africa. Up to this point the rise from the sea-level is only 2300 feet. At Machako's, in the heart of Ukamba, we have attained 5000 feet, and the wind-swept plateau is here bitterly cold. From Machako's we pass on towards the still higher lands of Kikuyu, crossing the plains of the Athi, the sportsman's paradise, where every kind of game roams in thousands. These great stretches form the neutral ground of the Masai, Wa-kikuyu, and Wa-kamba, but the former alone dare use them to graze their flocks. Kikuyu is a hilly country surrounded by forest, at an elevation of some 7000 feet. It is densely populated, and closely cultivated with various kinds of grain, beans, potatoes, and all African produce. The climate is that of Europe, the nights often bitterly cold, with a slight frost, the air bracing, and the flora is similar to that of the temperate zones. The people are demonstrative and excitable, and have some of the characteristics of both the two great classes which I have described, but approach more nearly, both in appearance and in language, to the Bantu stock. They have proved themselves treacherous and unreliable; their weapons are both spear and bow. Descending the Kikuyu escarpment, we are in the country of the Masai, at an elevation of 6000 feet. Here, as

on the Athi plains, the grass is cropped close to the ground by the flocks of the Masai and the vast herds of game, and the country is therefore completely open, except where shut in by the neighbouring hills. This people and their country have been so fully described by the eloquent pen of Mr. Joseph Thomson that there is little for me to add. The loss of their cattle by the plague has greatly tamed their arrogance, and continual contact with caravans under British officers has taught them better manners than they knew when Mr. Thomson made his remarkable pioneer journey. My route to Uganda was *viâ* the Lake Baringo, and across the ranges of Kamasia and Elgeyo, all of which have been fully described by the same author. We will therefore pass round the north of the picturesque little lake of Nakuru, and follow the gradual ascent, which lands us at last, at an altitude of over 8000 feet, on the top of the Mau plateau. This is the route for the projected railway, winding between the hills, where there is no steep gradient to surmount, the deep Eldomo ravine being the only formidable obstacle. But gradients and obstacles I must leave the professional surveyors to discuss.

From Nakuru onwards to Kavirondo the country is wholly uninhabited, and since through Masailand there is no food obtainable—the people being exclusively pastoral—supplies must be carried from Kikuyu to Kavirondo, a distance of some 250 miles. But this country seems to me to be one of great possibilities. To us who had lived so long in the tropics, the temperature seemed like Arctic cold. The pasture is the richest natural grazing I have ever seen, excellent fodder grass being mingled with white clover and trefoil. It is intersected in every direction by endless streams of clear-running water: the patches of forest afford ample fuel; and the stately junipers, attaining a diameter of five or six feet, as straight as a ship's mast, would, with the bamboos, afford building material, albeit of a somewhat brittle class. It is here that I should like to see the grand experiment of European colonisation tried—the experiment the result of which is to determine the future of this vast continent. The locality is admirably adapted to stock-rearing operations and ranching on the lines adopted in Manitoba and the 'Far West,' or for sheep-farming. This plateau is bisected by the Equator. I see no reason why, with its cold, bracing climate, its abundant food and water and timber, it should not afford scope for industrious settlers, and rival the flourishing plantations made in the Shiré Highlands by the brothers Buchanan, and the Moirs of the African Lakes Company, and the fields and gardens of the Scottish Established Church near Blantyre. I indicated, in a paper read before the Royal Geographical Society in London, a theory which those more able than myself to estimate its possibility may discuss. It was whether, given sufficient altitude to ensure the requisite climate, proximity to the Equator would in itself exert a beneficial influence on European residents. I showed that the hill-stations in Northern India are not adapted to the absolute naturalisation of European settlers and the rearing of their children without change to Europe, though the climate is perfect; while the southern station of Ootacamund, nearer to the Equator, has proved suitable to European colonisation. This vague theory

may be supported by many other instances. Thus, the Arabs and coast settlers go from Mombasa on the East African coast to Kismayu, Brava, and the Somali coast ports nearer the Equator, for change of air, because, they say, these places are more healthy. Therefore, *ceteris paribus*, a decrease in latitude would seem to indicate better health conditions for Europeans living in the Tropics.

Descending from these lofty plateaux to the Kavirondo plain, at an elevation of nearly 4000 feet, we are again in the midst of a dense population. There is no more friendly tribe in Africa than these simple Wakavirondo. Both sexes repudiate any kind of dress, but the male warrior in his garb of war is a wonderful and strange sight. Horns of antelope, tusks of the wart-hog, or huge outspread wings of gigantic cranes, from two to three feet across, are fastened on his head, without regard to convenience; his face is painted in various devices with red and white chalk; the rest of him is as God made him. Armed with a shield and a long and inoffensive-looking spear, he will cut such capers to assure himself of his own valour as shall jeopardise his head-dress and make you smile. Warrior after warrior will come forth from the band, breathing defiance and leaping and bounding and spearing innumerable imaginary foes, to the admiration and astonishment of all beholders. As the spirit of deathless fury gains ground, the frenzy becomes greater, and the whole mass are seized with unrestrainable ardour for the battle; and, having thus produced their courage to order, they advance towards the foe—generally, I believe, to run away as soon as they see him. Whole villages turn out as you pass, and stand like nude bronze statues on the mud walls of their villages, greeting you with smiles and I know not what strange words of welcome. They will bring out supplies of flour and grain, chickens and bananas, to give to the tired porter, or to barter for pink beads—though what becomes of the tons of beads they obtain is a mystery, for they wear but few. I like these simple, good-hearted people—very children of nature; and I hope that the influence they will hereafter follow may be that of Europe, and not of the slave-hunter, who, I fear, is already getting a footing in their country.

Leaving Kavirondo, we pass westwards to Busoga. No natural boundary divides the two countries, unless it be an insignificant stream; but a more complete change, both in the physical aspect of the country and in the people that inhabit it, it is impossible to conceive. From the open plains and grain-fields of Kavirondo you pass at a single step into a country of dense, endless banana-groves; potatoes and cassava take the place of millet and maize. Instead of savages devoid of any clothing whatever, you find yourself among a people clothed, man and woman alike, in the beautiful soft *mbugu*, made from the bark of various figs. The Busoga *mbugu* is dyed black; the Uganda is of a bright brick-red. Chiefs wear it looped up over the right shoulder, in a graceful and carefully arranged plait, from which projects a long wand. The *tout ensemble* is not unlike an undergraduate's gown. The country is densely populated, and for mile after mile the path leads through groves of bananas and frequent villages.

It is said, I know not on whose authority, that years ago the great

Wa-huma tribe, migrating southwards, overran the countries of Uganda and Unyoro, and founded the vast kingdom of Kitara. This name Kitara is a useful one, since it indicates that district of Uganda and its sister countries which has such a marked natural boundary, viz., the Somerset Nile, the Albert Lake, Ruwenzori, the 30th parallel of longitude (borders of Congo State), the 1st degree S. lat. (frontier of German sphere), the river Kagera, and, finally, the Lake Victoria on the east.

Traces of this immigration of Wa-huma remain in both Unyoro and Uganda. The royal family of both countries is largely of Wa-huma stock. A considerable number of the tribe are scattered through the land, and prior to the death of the cattle they were the herdsmen of the Wa-ganda: but now they have gone I know not whither, and one sees few of them.

This wave of immigration appears to have passed westwards of the Lake, and not to have crossed the Nile. Usoga is therefore entirely free from traces of the Wa-huma. The Wa-soga are a more primitive people than the Wa-ganda, though identical with them in origin and character. They have not been subjected to the influences of European or of Arab and coast visitors, as the Wa-ganda have for many years. They are a very brave people, but are still, happily, armed only with their spears and shields, though they are eagerly endeavouring to procure fire-arms from every available source, and it is only by the superiority of their arms that the Wa-ganda hold their supremacy over them. The country is rich in flocks, and formerly contained great herds of cattle. Produce of all kinds is in great abundance, so that Usoga has earned the title of the 'Cook-Pot of Uganda.' There is no king of Usoga; the country, though small, is ruled by nearly a score of independent chiefs, each of whom, I believe, owes a sort of allegiance to some Muganda chief. The people are of an independent character; they detest the Wa-ganda intensely, and are ever ready to try and shake off their yoke. Thus during the recent troubles in Uganda the Wa-soga rose *en masse*. The chiefs are most cordial to Europeans, and welcome them, and are eager for their friendship, as in Uganda; but throughout Kitara I believe the peasantry to be averse to all European interference, for they are blindly loyal to their kings and chiefs, and fear that the white men may undermine the power and prestige of these rulers.

The Wa-ganda are a singularly intelligent people, excessively eager for knowledge of all kinds, whether it be of reading and writing, of religion, or of useful artisan trades. Those few who have had an opportunity of learning any trade have become most superior workmen. They will construct you a new stock to a rifle which you will hardly detect from that made by a London gunmaker. The Fundi Kisule, who learnt his art from Mackay, is an accomplished blacksmith, and will make a new spring or repair a damaged rifle with admirable workmanship. And their folding stools of rod iron, and their beautifully turned-out spears, attest their ability as blacksmiths. When first I heard of the proposal to establish a Scottish Industrial Mission in East Africa, I eagerly advocated (in reply to a communication asking for my ideas on the subject which I had the honour to receive) its location in Uganda.

Boat-building, carpentry, and indeed any other artisan work, would be eagerly sought by them, I am confident; and the difficulty would be to limit, not to obtain, the necessary number of pupils. Their indigenous arts bear evidence of their delicate handling and of their skill. I regret that I have not here specimens of the numerous articles made in the country to prove my point; but the few small things I have brought with me will, I think, indicate their natural talent. The Wa-ganda are a warlike people, and ever ready to go to battle. There are, I estimate, some six thousand guns at least in the country, the majority of which are muzzle-loaders, but a considerable proportion are improved breech-loading fire-arms. They are, moreover, an excessively litigious, argumentative people; and this, combined with their excitability and their pluck, renders them an obviously difficult people to govern—the more so that they are excessively distrustful and very untruthful. The intricacies of their system of land-tenure, and the complicated division of sub-chieftainships, almost defy solution to any but a born Muganda, and are the source of endless quarrels and litigation.

Uganda is divided into ten provinces, and the ten chiefs who rule these districts entirely drop their personal names, and are called by the traditional titles attached to those provinces. Of these, the four largest and most important have separate titles. Thus, the Chief of Chagwe is the Sekibobo; of Singo, the Mukwenda; of Buddu, the Pokino; and of Bulamwezi, the Kangao. The remaining seven are called by the names of their provinces, viz., Kitunzi, Katambala, Kasuju, Mugema, Kago, and Kaima. Superior in rank to these ten governors of provinces are the Katikiro (the Vizier and Chief Magistrate of Uganda) and the Kimbugwe. These two hold innumerable estates scattered throughout all the provinces, the inhabitants of which are their serfs. Below these twelve chiefs, and yet, in an almost inexplicable way, in some cases holding a position superior to some of them, come innumerable other chiefs. Outside these territorial chiefs and the holders of office there is a third important class, formed by the offshoots of the royal family, with their separate traditional rights and separate series of dependent chiefs. These are the Mlangira (male relatives), and the Bambeja (female relatives), which include two important officials in the State—the Namasole, King's mother (held by a royal lady in the event of the death of the real Queen-mother), and the Rubuga, or King's sister, an office also held by appointment.

Of holders of traditional offices at the court of the Kabaka, the chief are the Mujasi, Kauta, Gwanika, Sebajanzi, Salo-Salo, and Gabunga (chief of the islands and canoes), and many others. Corresponding to these, in some cases superior, in others inferior, are the holders of offices under the chiefs of provinces. Many of them have distinctive titles, such as the N'mt-we and Molondo of Chagwe Kagolo, Kalunda, and Sango of Buddu, etc. These again have their Katikiros, or Viziers; their Mujasis, or heads of armies; their Sebagadzis, and other distinctive offices with separate titles. The Wa-ganda themselves can form no table of precedence; one day they will tell you so and so is the bigger man, the next day they will contradict it. Yet all seem to have the clearest and most definite conception of the full powers,

the exact standing, and the comparative importance of each and every rank and office. Possibly, though I have only outlined the question in the baldest and briefest way, this may in some degree indicate the complications of the subject—a subject with which is inextricably interwoven the system of land-tenure. To the student of tradition—I had almost said of constitutional history—the origin of these systems, the derivation of the names of office, the gradual development of the functions of each, would form an interesting study; and from personal experience I can add that it would prove no easy one.

The Wa-ganda are fond of music, and you will hear their reed pipes or flutes from morning till night; yet, unlike the Swahilis, or the Atonga, Ajawa, etc., of Lake Nyassa, it is almost impossible to teach them English tunes, and they have no conception of singing. The language of the drum is carried to a singular perfection. There are drums four feet high and two and a half feet in diameter, and there is every intermediate grade down to the size of a flower-pot. There is the drum note of war, of peace, for marching, for halting, for curfew—even the orders to clean the roads and suchlike public notices are given by a few recognised taps, to me quite indistinguishable, but to the smallest Muganda boy conveying a clear and well-understood order. There are an infinity of musical instruments—hollow pieces of wood ranged in order, and emitting a series of notes when struck with a tiny mallet, and played like a zither: and many others, including banjos of all sizes. The one here was Mwanga's own, of which I took possession when we fought. These instruments are generally ornamented with snake-skins.

I should weary you were I to continue to talk of the ways of these curious people. But I cannot leave the Wa-ganda without one word about their national institution—the *Mbugu*. Every man and woman is dressed in a *mbugu* or large piece of bark-cloth, except those big chiefs who can afford fine white linen. This "cloth" is made from the bark of a species of fig, and not from an acacia, as in Nyassaland. There are many kinds of figs, which are cultivated for this purpose. Each kind has a separate native name, and each kind produces a particular quality, superior or inferior, of *mbugu*. The tree is stripped of its bark, and is then bound round with the juicy stems of the banana torn into strips. After a short time these are discarded; the tree apparently has suffered no hurt, and begins again to form a bark, which in due time will be again stripped. One variety only, with a large leaf and of an entirely distinct species, dies when its bark is removed. The largest trees rarely attain a diameter of one foot; the common *mbugus* are made from trees six inches in diameter. The bark is steeped and hammered out. Every little hole or rent is carefully cut out, and a bit inserted and sewed in with marvellous neatness and exactitude. Finally it is beaten with a mallet, in which grooves are cut to give it a ribbed appearance, and is dyed a rich orange colour—in Usoga it is invariably dyed black. Royal *mbugus* are beautifully made, and may measure some 12 feet square. The stuff is strong *with* the fibre, but easily torn across it. It is warm, and excellent clothing in dry weather, but gets like a sheet of wet newspaper in the rain.

The Wa-ganda have a recognised currency in *Sembis*, that is, cowries. These are essentially a form of currency, being applied to no other use than that of a token and a basis of valuation. The origin of this system and the source from which the cowries first came (for they are found nowhere in these lands) are curious matters of speculation. At the capital there are two regular markets with officers to control them, collectors of the King's taxes, viz., a small percentage on the cowrie value of all produce which changes hands. Produce brought in from the country is sold here, and oxen are slaughtered and sold retail, as in our butchers' shops.

The Wa-ganda have the keenest possible appreciation of justice and fair-play, but the grounds on which they base their decisions are frequently so utterly foreign to our conceptions that one never knows by what standard of discrimination any particular case is to be decided. Decisions which to a European seem harsh or altogether ebside the question are accepted with acclamation as the most impartial justice; while what would recommend itself as fair to a European may not infrequently (should it militate against some old-established usage) be received in astonished silence. Pending a really thorough and complete knowledge of all the points involved in these land questions, I endeavoured always to find a solution acceptable to both parties, reserving my own more direct jurisdiction for criminal cases where the facts were patent.

On June 16, 1891, I left Buddu for the Albert Lake, hoping to find the refugee soldiery of the late Equatorial Province somewhere in the district to the south-west of that lake. I marched nearly due west. Buddu I found to be some fifty miles broad, from the shores of Victoria to the borders of Ankole. Parallel to Buddu, and conterminous with all its western frontier, lies, according to the old maps, the kingdom of Koki. I found, however, that Koki is a very small state, situated on the south-west corner of Buddu, and extending to the Kagera river. The country bordering the northern half of the western frontier of Buddu is part of the large state of Ankole. My route lay above the northern boundary of Koki, as shown on the map. In the angle formed by the Katonga and Kyojia rivers lies a second small state called Bwera. Both this and Koki are subject to Uganda, and pay tribute to Mwanga through the Pokino, the chief of Buddu. Ankole is the headquarters of the Wa-huma, of whom I spoke as the founders of the ancient kingdom of Kitara. It is subject to a Wa-huma king, Ntali, a man of generous impulses, who gave shelter in his country to the Wa-ganda Christians when they were ousted from their country by the Mohammedan faction. He has sheltered also the refugees from Toru, the country lying south of Unyoro along the base of Ruwenzori. This country was also Wa-huma, under a king of that tribe, a close relation of Kabrega's, named Nyika. Ousted by Kabrega's armies with their guns and powder, to which the Wa-huma had only their spears to oppose, the people who escaped slavery and death fled to the fastnesses of the giant mountains, and to the hospitable protection of Ntali, and the land was given over to rapine and blood, and divided among Kabrega's chiefs, Ireta and Dukala and Katabarua. The exiled king died, and his only child, an infant boy,

took refuge, together with his cousin, at Mtesa's court. Both became Protestants, and the child has now grown into a remarkably handsome boy of eighteen. On Mtesa's death they had fallen into disfavour with Mwanga, and I heard of them accidentally as living in a distant part of Buddu. I brought them with me, and when I had driven in the two armies of Kabrega which he sent against me, I reinstated Kasagama, the boy—the rightful king of Toru. But I am anticipating. Ntali sent a little son, a very pretty Wa-huma child, said to be heir to his throne, to make blood brotherhood with me, and the ceremony was performed with considerable state. The Wa-huma are a race as entirely different from the Negro or the Bantu tribes as are Asiatics. I have already described their intelligent and often handsome faces. Throughout their country are settled large numbers of the agricultural Bantu tribes, who cultivate the soil and produce bananas, potatoes, and grain. The Wa-huma, like the Masai, were exclusively pastoral, and lived solely on the milk and flesh of their cattle. Now, with the total destruction of these by the plague, the people have died in vast numbers, and the remnant are dependent on the agricultural settlers for a scanty subsistence. They are themselves slowly learning to cultivate the fields, but vegetarian food is unnatural to them, and their gaunt and half-starved frames, almost invariably covered with skin disease, attest the hardships they are undergoing. Northern Ankole is an admirable pasture country; undulating hills of red marl, and long sweeping valleys of richer soil, alike produce an excellent fodder grass, and the interminable river swamps, bottomless quagmires choked with papyrus which abound in Uganda and Unyoro, cease below some half degree of latitude south of the Equator. This route to the Albert Edward, and on to the Albert Lake, therefore affords every facility and every requisite for animal transport, and its discovery is a valuable addition to our information bearing on the development of these countries. Iron abounds, as it does throughout East Africa, and has been worked by the natives to make their spears and hoes. Crossing the narrow channel which divides the Lake Rusango from the main body of the water of the Albert Edward Lake, a channel at most 500 yards across, I entered Katwe, and took possession of the Salt Lake. This country—Usongola—and my journey to the outpost of the Manyema slave-raiders on the west of Ruwenzori, at Miala, across the Semliki in the Congo Free State, I have already described in my paper read before the Royal Geographical Society, London. I have related how I passed onwards, after building Fort George on the neck of land between the big lake and the Salt Lake, and built a second stockade (Fort Edward) at the foot of the great Ruwenzori peak, between the rivers Sebwe and Mupuku, and again left a garrison to hold the gate of Usongola between the mountains and the lake, the country from which I had ousted Kabrega's people. It was here, at the Salt Lake, that I crossed Mr. Stanley's recent route, but as I had seen neither his book nor his most admirable maps at the time that I left Uganda, my journey, so far as I was concerned, was entirely in the nature of new exploration, though in the discoveries of the great Albert Edward Lake and of Ruwenzori I had of course been anticipated.

Before leaving this lake I would offer the suggestion that its name, with Mr. Stanley's permission, be changed to Lake Clarence, thus naming it after the son instead of the father, since constant confusion is caused by the similarity of its designation to that of the Albert Lake, so named by Baker after the Prince Consort in 1884.

Leaving Mr. Stanley's camp, I followed the eastern base of the Ruwenzori mountains, crossing the endless streams which descend from its perpetual snows, and bear their clear, sparkling, icy-cold water to the Wami and Mpanga, and so to the Albert Edward. And here it is curious to note that the drainage of the eastern Ruwenzori is not towards the Albert, and so to the Nile, but towards the southern lake, from which the only overflow is the Semliki, a river which at its exit probably conveys a less volume of water from the Lake than is contributed to it by the Mpanga alone. The country is wild, with dense elephant grass 10 feet high, and scrub bush obscuring the view, except where, as at Butindi and Butanuka, we emerge on densely populated and cultivated areas. The ground rises gradually from the level of the Albert Edward, 3300 feet, to some 5300 feet at Kiaya. Here we descend into the head of a narrow valley, while the plateau we have been traversing trends away to our right, and forms the uplands of Unyoro, its bold outline appearing from the Semliki valley and the Albert Lake like a lofty range of hills. The valley of Kiaya is extremely fertile, intersected with streams, and studded with banana groves and cultivated fields. I found here a small Wa-ganda colony, who had left their country in the troublous times of war. The valley opens out as we pass along it, and winds among the hills, the giant mass of Ruwenzori still towering on our left. Between the edge of the plateau we descended, and the base of Ruwenzori, there is a deep trough or gorge, the hills rising steeply, as it were from their very foundations, and disdaining connection with the plateau which reaches to their feet. Leaving Kiaya we pass through a wild country of quartz and scrub jungle, intersected at right angles by gigantic ravines of rich soil, in which are villages, forest and cultivation, and so we reach the edge of this lower plateau and look down on the Semliki valley below us. Simultaneously the massive peaks of Ruwenzori give place to lesser hills, which descend to the plain. Opposite us appears a new range of mountains, increasing in height from south to north; mountains they seem, but, like those we leave behind us, they are really the escarpment of the plateau on which the sources of the Ituri and the other great affluents of the Congo take their rise, and which for convenience we will call the Kavalli plateau. Crossing the plain and the Semliki, now a noble stream, passable only by canoes, which we found great difficulty in securing, being attacked once more by Kabarega's hostile rifles, we waded all day till nightfall through a pestiferous swamp of dense reeds and giant grass, through which we pioneers made our way with infinite toil, throwing ourselves bodily on the mass of vegetation and pressing it down till we forced our way over it waist-deep in water. As one after another was completely exhausted with the violence of the physical exertion, a new hand would take his place. The swamp wasps also occasionally attacked us, and I was right glad to gain dry ground just before the sun set and darkness fell. Such incidents occur in African travel.

Marching along the base of the Kavalli hills, through a country little traversed by man, and following the paths made by elephant and hippo, through very dense high grass and patches of forest composed of the lovely *Mterounda* and many other gorgeous flowering trees, we met no inhabitants till we came upon a small village of friendly hunters in the depths of a magnificent forest. Guided by them we ascended the hills, and ere long found ourselves at the headquarters of the Soudanese whom I had come to find.

I was cordially welcomed by them, but I found their leader, Selim Bey, a man by no means easy to deal with at first, for he had absolute power over them, and was a man of resolute will. He wished to retain this absolute control; while I declined to enter into any plans to help them unless he placed himself under my orders completely, if he accompanied me. We had long discussions on several consecutive days; and as his force very largely outnumbered mine, and were armed with Remingtons, and had a very large supply of ammunition, while I had very little, and I had heard Mr. Stanley's reports of their treachery and Selim Bey's own deceit, the position was not an easy one. However, I carried my point, and he ordered a parade of the soldiers before me. It was a strange and, in truth, a thrilling sight. To all appearance they were intensely loyal to the Khedive; and Selim Bey, pointing to his snow-white hair, said it was not age—for he was not much over forty—which had turned his hair white, but the war and the troubles in the Soudan, throughout which he had loyally upheld the Effendina's flag through good repute and ill repute. He would not consent to pledge himself in any way to me till the Khedive should have given him permission to transfer his allegiance; nor would he change his flag until the Khedive should himself dispense with his services. "From a boy till now in my old age," he said, "I have served under this flag, and exposed my life for it many many times; nothing in the world shall make me give it up unless the Effendina himself tells me to." And, if his tale be true, he has indeed fought bravely and suffered loyally for it, having been imprisoned by the disloyal rebels, and expelled from the country. It was a thrilling sight to see the remnant of the troops of the old Equatorial Province march past. Less than half, I was told, were there; the rest had died fighting for their flag. Many of them had honourable wounds to show. Their banners and flags were tattered and torn, they were clad in long coats made of skins, and their band made strange music with bugles and drums and trumpets. They hailed me as their deliverer, who had come to take them away from the savages among whom they dwelt, and restore them to their status as soldiers of a civilised Power. The enthusiasm was great. I addressed a few words to them, and told them that I, as a soldier myself, respected their loyalty to their flag, which they should retain until I had written to the Khedive and his reply was received. They promised to be ready in sixteen days, and I would allow no delay, for I was anxious about Uganda. Meanwhile, I explored the shores of the Albert Lake; and, though these people do not know what it is to hurry, they were ready at the appointed time. Through

the recent troubles in Uganda they have remained loyal to me, though I am inclined to believe that the hostile Mohammedan faction tried to induce them to combine against me at a time when the two Christian sects were fighting. I was told that their reply was: "Captain Lugard has saved us in our trouble, when we knew not where to turn, and we will not fight against him. We are his people, and if you fight against him we will attack you in the rear." But what is to become of these people if Uganda is left? Their claims for back-pay have been refused by the Egyptian Government, but I am in hopes that I shall succeed in obtaining justice for them—a duty which devolves upon me, for they were loyal to me.

The Kavalli plateau was the site of Mr. Stanley's protracted encampment, and has been fully described by him. Undulating hills, with sparse villages dotted here and there form the landscape: some parts afford good pasture, others are covered with the ten-foot elephant grass. Doubtless the loss of the cattle and the immigration of the hordes of ruthless Soudanese had denuded the country both of its inhabitants and its food. When I was there, there was little of either. The plains along the valley of the Albert Lake are also thinly populated. A few small detached villages, whose inhabitants lived by fishing and by washing a saline earth, and preparing salt, which they sold to the people of the hills for food, were all that were to be met with. These wretched people groan under the tyranny of the despot of Unyoro; they dare own neither cattle nor flocks, nor crops nor food, for all would be taken from them by Kabarega. Indeed, they hardly dare call their lives their own. Periodical raids by the Wa-nyoro drive them for shelter to the depths of the forests or the recesses of the mountains—those who are not fortunate enough to fly in time, or are unable to do so, by reason of age or sickness, are massacred or enslaved. Such is Kabarega's rule. They welcomed me and begged me to live among them. I replied that I was about to place a barrier between them and their tyrant, and that they should live in peace. Large areas of excellent pasture-land extend along the shores of the Albert Lake, and where the hills impinge upon the lake to the north, and an excellent harbour is formed near the long promontory of Nyamsassie. Southwards of this the country becomes arid and sterile, covered with sparse jungle scrub, till it merges in the great swamp around the mouth of the Semliki.

On October 5th, I left Kavalli's with the vast following of the Soudanese, their wives and their children, their slaves and their followers. I sent an advance party by water, which rounded the mouth of the river in two canoes lent me by the friendly chief, my blood brother Katonzi. They gained the further bank to find that Kabarega, in order to prevent my return, had destroyed every canoe on the river. Katonzi's willing followers ferried us across—the work of many days—and, one by one, the refugees were counted as they landed, men, women, and children—8006 in all, besides the advance party of some 200 more. With my Wa-huma guides, my Wa-ganda volunteers, and my old faithful followers, we must have numbered over 9000 souls.

I must leave to your imagination the incidents of a march with such a host—like a second Exodus, for time forbids me to trespass longer on your

patience. I followed my old route as far as Kiaya; here I struck due east, and ascended the Unyoro plateau at a point a little north of where I had descended. I marched on the capital of Ireta, the great chief of all southern Unyoro, whose cruelties had rivalled Kabarega's own. Here, in his own headquarters, I built the first British fort in Unyoro, and left in it a fourth of my Soudanese. It was named Wavertree.[1] After two days' march due south, across endless river-swamps, through a country singularly fertile and rich in every kind of produce, I halted and located in Fort Lorne the second half of the 1st Regiment of Soudanese, with all their mass of followers. Near each of these two forts were large forests of fine timber, useful both for building and for fuel. So far I had marched within the boundaries of Unyoro proper, so that Toru, now under our protection, should suffer no hurt. Fort No. 3, at Kivari, some three days further south, was on the borders of Toru, near a huge forest, and, like the others, in the midst of a country abounding in food of all kinds. Here I left the first half of the 2d Regiment. The 4th and 5th stockades, at Ntara and Fort Grant, shared the remaining Soudanese between them. They were located in Kitagwenda, thus completing the chain from lake to lake, and shutting Toru and Usongora off from Kabarega. This was the season of the rains, and daily we marched in pouring torrents, while I had to bridge river after river to pass across it my thousands of people. I wish that time would permit me to describe to you one such scene—never to be forgotten—or to give you some description of the hills and swamps of Unyoro, the forests of Toru, the magnificent gorge of the Mpanga river, or the homeward march to Uganda. Already I have exceeded my bounds. The entire time taken in this expedition for the relief of the Soudanese and their location in the forts was exactly six months, and the total distance travelled was about 600 miles. As we built our colonies, and liberated the captives who fell into our hands, the news went forth among the people of Toru that the white man had indeed come to build and to stay, and was no passer-by on his travels. From every side they poured in; at each day's camp the same story was repeated by newcomers, that they had heard how on our upward march we hurt neither man nor woman, destroyed no houses, captured no slaves, how we had come as protectors against the tyrant Kabarega, had restored the only son of their dead king, and now were building our houses to stay in the land. They told me how the people who had trusted the Egyptian Government, which had occupied and garrisoned Mruli and Fauvera in Northern Unyoro, had been deserted by their protectors, who had suddenly abandoned them, and how they had been massacred by Kabarega *en masse*. They asked me if we meant to stay, or if we too should suddenly go, and leave them to be massacred. I told them this country was ceded to British influence by the Powers of Europe, and I told them the British flag never went back. I left Mr. de Winton to organise the country; I told him to go round the whole district with Kasagama, to appoint chiefs and drive out Kabarega's last lingering troops. He did go, and he wrote to tell me that the people were flocking

[1] After the residence of Sir J. Kirk.

in by thousands with great rejoicing. And here, in the execution of his duty as he read it, engaged in a work which was an honour to England, this brave young officer died. We have travelled over much ground, and, though there were long foodless stretches in parts, I am proud to say that my men have always had their day's food, and that there has been no starvation or even hunger among them from the day I left the coast till I returned three years later. We have passed through hostile countries like Unyoro, where Kabarega's armies, with very many guns—some of them breech-loaders—opposed our progress; but the total mortality from sickness and all causes has, I think, been less than it would have been had the men been living on the coast. I look back with pleasure on those months of travel, and I look back with pride on the attachment of my comrades and of my men, and the determination the latter declared to me to serve with no one else if I should return to Africa. For success in African travel depends solely on the spirit which animates all; and I am, indeed, fortunate that my comrades were of the very best—men whom I could thoroughly trust, and who trusted me; and that my men were loyal and good—Zanzibaris, Soudanese, and Somalis alike—so that punishment was rarely needed, and discipline easy to enforce. I have told you of the capabilities of the Wa-ganda, of their progress in civilisation, of the promise they show. I have told you of the treaties and the bonds of blood brotherhood made with Ntali of Ankole, with Katonzi and Mgenyi. I have told you of the contract with the Soudanese refugees, and loyally they have performed their part and remained faithful to me in the recent troubles in Uganda. Above all, I have told you of the pledges to the people of Toru, pledges and promises made rather by actions than by words. In Africa my task has been no easy one; I have come to England to find a still harder one before me, and one for which I have no qualification—the task of publicly explaining our duties and responsibilities in Africa. Scotsmen have been Britain's foremost pioneers in Africa—from Livingstone through successive years to the East Africa Company of to-day, which is largely, almost entirely, Scottish—its Chairman, Sir W. Mackinnon; its Vice-Chairman, the Marquess of Lorne; and most of its Directors. Scotsmen have made Nyassaland. It was Scottish feeling mainly (as I well know) which promoted the formation of the Nyassaland Protectorate; for it was my task, when last in England, to advocate, so far as my small efforts could avail, the cause of Nyassaland and Karonga's garrison. Scottish missions, as I can testify, have done a great and good work there; already they are penetrating into East Africa too. Already British lives have been given for East Africa, already large sums of money have been spent without hope or expectation of return. Shall these lives be wasted, this money be worse—a thousand times worse—than misspent? To Scotsmen I can leave the reply with confidence, for Scotsmen have ever shown themselves sensible of British honour and good faith.

After the paper, a vote of thanks was proposed to Captain Lugard by Dr. George Smith and seconded by the Rev. Professor Blaikie, and unanimously accorded.

The Chairman then presented Captain Lugard with the Silver Medal of the Society, and its Honorary Diploma of Fellowship.

In his reply, Captain LUGARD said :—

My Lord Duke, Ladies, and Gentlemen,—I hardly know how to express to you my thanks for the most kind way in which you have welcomed me this evening, and for the flattering things (not one half of them deserved) which have been said of me. I have also to thank the Royal Scottish Geographical Society for the *very* great honour they have done me in presenting me with the Medal and Honorary Diploma of Fellowship of the Society. I feel this indeed to be a *very* great honour, and the terms used by His Grace the Duke of Montrose in making the presentation, and by the mover and seconder of the vote of thanks, have added still more to their value to me. Their words will ever remain in my memory in connection with the medal and with my visit to Edinburgh—a visit I shall ever look back upon with the liveliest feelings of pleasure and of gratitude.

I am glad to be able to inform you that I received private letters this morning from Uganda, from Captain Williams, now in command there, from the Katikiro, the vizier or principal chief in Uganda next to the king, and from the chief of the Mohammedan party. The letters are dated August 19th, and contain the most satisfactory news. Captain Williams reports that "all is well in Uganda." He says that the Roman Catholics are living quietly and contentedly; the priests are rebuilding their old quarters at the capital, and the bulk of the faction now located in Buddu have been "behaving very well," the territorial area I allotted to them appearing adequate for their wants. A rebel chief, named Mtegeri, who has been an outlaw and a bandit since the days of Mtesa, and who continually made raids from his forest fastnesses on the villages in Chagwe (Eastern Uganda), defying all authority, has been subdued and taken prisoner. He was almost the last remaining source of trouble in Uganda. Difficulties with Stokes, a trader in those parts, which were in a fair way of solution, are now satisfactorily concluded. Trade is reviving, and some ivory is beginning to come in, as a nucleus of revenue. Mbogo, lately king of the Mohammedans, who was handed over to me as a pledge of the good faith of that party, when I made peace with them, is living most happily at the British fort, Kampala. One of the principal Mohammedan chiefs writes to me himself, sending his own and Mbogo's salaams, and saying that "everything is getting on very satisfactorily in Uganda." All the British officers are well. The Katikiro writes saying all is peace in Uganda, and sending many compliments to me as his old friend. His letter, in his own handwriting, is here, but I fear few of you will be able to read it, as it is in the Ki-swahili language.

This very satisfactory news reflects great credit on Captain Williams, who is carrying on the administration in the same spirit, and on the same lines, as were inaugurated by myself; and it comes at an opportune moment to confirm what I have said of the settlement of Uganda, and to prove that the work done there has had satisfactory results, that my anticipations of the soundness of the settlement appear to be well founded, and that peace and order have been restored in a country which was the scene of continual war, death, and anarchy, before the advent of the British administration I was sent to establish. I am sure that you all would deplore with me, that a work which promises so well—a work carried out under no small difficulties—should be abandoned, just when those difficulties appear in a fair way to solution. You will, I am sure, acknowledge the pluck, perseverance, and ability shown by Captain Williams in his work, and I know that such an appreciation of his work (conveyed to him in my reply to his letter) will be deeply valued by him, and will encourage and help him in a task which requires all the encouragement you can render.

ANCIENT IMAUS, OR BAM-I-DUNIA, AND THE WAY TO SERICA.

By Robert Michell,

Member of the Imperial Russian Geographical Society.

(*Continued from page* 605.)

The Bam-i-Dunia is to us a geographical revelation of comparatively recent date, for most of the several Pamirs of which it is constituted are fresh cartographical features not much more than twenty years old.

Pamir is a word known to us through the Chinese and Buddhist pilgrims of the fifth and seventh centuries. It is said to be derived from the *Upa-Meru* of the ancient Indian cosmography. Sir Henry Rawlinson has said: "It is highly probable that *Pamir* and *Meru* are of kindred etymology, both the names being connected with *mir*, a lake."[1] The Pamir river, which the Chinese doubtless confounded with the Murghab-Aksu of recent discovery, was an importation into our maps from those early sources.[2]

Bolor, of kindred origin and perverted in transcription, was another appellation by which this great orographic feature of Central Asia was long designated in Europe. Under the sanction of Humboldt, the Bam-i-Dunia was taken to be a longitudinal range of mountains, and the faith in "the Bolors and their country"[3] produced the famous but eccentric map attached to Ritter's *Erdkunde von Asien*; whilst the spurious travels, exposed by our English authorities, coupled with a counterpart discovered in St. Petersburg, accounted for the errors of Arrowsmith's cartography, which were ultimately rectified through the remarkable perspicacity of the late Colonel Yule.

Our actual knowledge of the existence of the Pamirs dates from the period of Wood's discovery of the lake known as Seri-Kul or Iskander-Kul, which he took to be the main source of the Oxus, and named Victoria; but it is now better known as Wood's Lake.[4]

Next comes the ill starred Lieutenant Hayward, who was the first European to break ground further north, giving to the Royal Geographical Society the valuable results of his explorations.

The real opening up of this question, leading to the solution of the Bam-i-Dunia problem, is strictly referable, on the one hand to the establishment of the independence of Kashgar under the Atalik Yakub,

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[1] See also *Le Pamir*, J. B. Pasquier, p. 15.

[2] It was given on Father Hyacinthe's map of 1821. M. Ivanof has observed that the rivers of the Pamirs issue from their sources circuitously, unfolding fan-wise. This, curiously enough, coincides with the maze-like representation on the ancient Chinese map attached to the *Mémoires of Hiuen-Tsang*, by M. S. Julien, and so thoroughly appreciated and justly praised by V. de Saint-Martin.

[3] *Vide* Mr. J. Michell's translation of Veniukof's paper, *Journal Royal Geographical Society*, 1866.

[4] Wood's *Oxus*, p. 233, edition of 1872. This lake must not be confused with the Iskander-Kul in the Upper Zarafshan region, above Samarkand.

which induced our Indian Government to send the Forsyth Mission to that country in the year 1873, attended by officers who traversed the tableland in various directions,[1] and on the other to the Russian occupation of Kokand, followed in 1876 by the Russian military operations and the reconnoitring expedition to the Great Kara-Kul and Rang-Kul lakes under General Skobelef, of Shipka and of Geok-Tépé fame.[2]

The English and Russian surveys were linked at this period at Chatyr-Kul by Colonels Gordon and Trotter, and in 1883 they were further linked by the Russians at Tash-Kurgan and on the Alichur river.

Thenceforward the gateways to the Bam-i-Dunia were opened to the Russians from Kokand and through Bokhara, passing also through Karateghin from the Upper Zarafshan valley.

Then come the unostentatious but remarkable journeys of a few specially instructed pundits sent by our Indian Government to penetrate this region from the south.

In the year 1877 the zoologist Severtsof, a gentleman who had paid with his ears for his experiences in the Thian-Shan some years previously, traversed the Roof of the World by Kara-Kul and Rang-Kul to the Alichur Pamir.

To the list of English names, as of those of intrepid explorers in the regions touching the Bam-i-Dunia on the south-east and east, we may add those of Johnson, of Cayley, and of Shaw, who preceded the Forsyth Mission. The brothers Schlagintweit passed this way in 1856, and several of the pundits from the Trigonometrical Survey Department of India brought back much useful information from that region.

From the Russian side we have a host of meritorious men of science who have at last filled in the whole of the Thian-Shan system, with its ramifications, describing its physical character and its historic relations, and mapping all that up to the period of the occupation of Turkestan (capture of Tashkend, 1865) had been accepted geographically on the faith of unravelled histories and on hypotheses.

I have striven to show that large masses of men, whether in peace or in war, never really traversed the Bam-i-Dunia to proceed further from west to east, or *vice versâ*, except on some occasions in its southern part. At the same time it is by no means my opinion that those impediments which were so effectual in the past will be suffered to remain insurmountable in the future. The old beliefs in the insuperable obstacles have been considerably shaken, and the rapid rate at which, like racing clouds on a summer's day, the old notions have been driven before the current of events, indicates how soon they will be completely dissolved into the thin air of the Bam-i-Dunia, pointing indubitably to the very near future when every path over that interesting region will teem with living streams of men and beasts.

Even a lady has trodden every inch of the way from the Kizyl-Art of the Alai range to Kashmir, and we may be very sure that these dainty feet will be followed on the earliest opportunity by the firmer clanking

[1] *Report of Sir D. Forsyth's Mission to Yarkund* in 1873-4. Calcutta, 1875.

[2] *Vide* R. Michell's "Paper on the Russian Expedition to the Alai and Pamirs," *Journal of the Royal Geographical Society*, 1878.

tread; for, however praiseworthy may be the services rendered to science by the pioneers, every stage of their progress is and will be the result purely of military *reconnaissances*, directed by a provident policy pursuing a clearly defined object.

The Gogs and Magogs and other bogeys of Asiatic superstition are nevertheless still invoked and diligently set up as scarecrows on this elevated ground. Thus a great deal is made of elevation, of ascents and descents, and with great emphasis it is represented that cold winds and heavy snowfalls render those uplands next to unendurable and almost uninhabitable. Forgetful of the latitude in which it lies, the public are taught to associate with Bam-i-Dunia a perfectly intolerable severity of climate.

In the year 1875 the late M. Fedchenko recorded the following opinion:[1]—

"If, possessed of the information which I collected during my travels, I were now able to visit the Pamir, I should at once set out and traverse the whole of it without asking the way of anybody. Complications and difficulties could arise only from political causes. The Pamir and the region of the sources of the Oxus cannot long remain unexplored; its secrets will be revealed either by Russians or by Englishmen. . . . I am more inclined to believe that this will be the work of Russians. I believe this, because access to the Pamir is easier from the north. From all I have read, it is very difficult to penetrate through the mountains from India. From the Russian side the conditions are much more favourable, and if it were only a question of passing across (I do not speak of exploration), and a volunteer came forward, I would boldly wager that, starting from Tashkend and crossing the Pamir, he could reach the Siri-kul and return in the course of a single month."

In his conjecture M. Fedchenko was prophetically correct.

The Ivanof-Putiata-Benderski Expedition explored nearly the whole of this area, devoting three entire months to a leisurely performance of its labours, viz., from the end of June to the beginning of October.

In 1889-90 Colonel Grombchefski, failing to obtain the permission of the Afghans to pass up the Panj from Wanch, returned to Altyn-Mazar in the Trans-Alai Mountains, and made a fresh start in July 1889, with a "modest" convoy of thirteen men, and with thirty-six camels and other beasts of burden. He descended to Ceres on the Murghab, where he again failed to obtain permission from Cabul to enter Kafiristan, and therefore transferred his activity to the Raskem river. Being unsuccessful in his attempt to enter Kashmir from that quarter, he made his way in trying circumstances in December to the Tibetan plateau, and at Nia, on the 7/19 March 1890, he joined Colonel Peftsof's Tibetan party.

Grombchefski's force dwelt two whole months—August and September—on the Pamirs, and October and November were passed in the basin of the Raskem.

Neither of these Russian expeditions to the Bam-i-Dunia was in

[1] Fedchenko's *Travels in Turkestan*, in Russian, 1875, p. 154.

any main direction impeded in its marches, and, with few exceptions, they turned aside because of an obstruction of snow on some passes. Ivanof, it is true, encountered natural obstacles on a section of the Upper Murghab; but even Grombchefski, throughout the very worst season of the year, performed all the excursions planned out for him, except those into Kafiristan and Ladak, which were politically closed.

Colonels Gordon and Trotter were on the Bam-i-Dunia in the most unfavourable season, yet they moved freely over all the passes in all the directions of their recondite surveys.

If, according to Ivanof, we draw two perpendicular lines across the map of Asia, from north to south, from the Trans-Alai to the Hindu-Kush, —one passing through the Chinese fort of Tash-Kurgan and the other through the Shighnan village of Sardym on the Ghund river (72° 20′)—we shall obtain a length of 300 miles and a breadth of 187 miles, and this parallelogram will contain the Bam-i-Dunia in horse-shoe shape, the hoof treading eastwards. The southern edge of this horse-shoe will lie from the head of the Wakhan river to Kok-Bai pass and the western end of Yashil-Kul, the northern edge lying from the Kizyl-Art to Kokui-Bel and Kara-Bulak passes. Tracing across this an arrow along the Murghab-Alichur mountains (W. to E.), the eastern point will touch at the mouth of the Ak-Baital river.

The area thus obtained will be 37,000 square miles.

This has been all explored (and almost all thoroughly) by scientific and intelligent men. So well, indeed, has this region been studied, that its geological structure, its natural history, topography, and hydrography, have been very satisfactorily resolved at St. Petersburg, and the questions considered by the great Humboldt, by Ritter, and others have been finally determined; the matter of the speculative, as well as of the apocryphal, geography of the "Bolors" has been set at rest.

M. Ivanof's experience of the ways of communication was epitomised by him in the following words:—

"A visit to this region explains the truth of the native adage, 'There are no roads on the Pamir, because it is everywhere traversable'; and, indeed," adds M. Ivanof, "the way lies in every direction whithersoever the traveller chooses to proceed. He has but to fall in with the direction of the mountain ranges."

And again: "In explanation of what the Pamirs are like, the Kirghiz replies: 'They are spacious, smooth valleys between low hills . . . only grass grows there; there is no wood. Nomads alone dwell there with the yak, the arkhara (*Ovis Poli*), and the bear; there are numerous roads over the Pamirs . . . roads everywhere . . . the place is high and cold, the ground is as smooth as the palm of your hand."[1]

What Major Cumberland, Lieutenant Davis, and Captain Younghusband may have to observe, if allowed to speak candidly or at all, on the Kirghiz view of the diversity and practicability of the ways over the Bam-i-Dunia, it would be well to know, and to know shortly; but Mr. and Mrs. Littledale convey no impression of insurmountable barriers

[1] *Proceedings Russ. Imp. Geog. Soc.*, vol. xxi. part 2, p. 132.

or of imposing elevations until, having crossed the easy Baroghil pass (only 12,480 feet, and only a sloping down like the Kizyl-Art), they begin to contend with the difficulties of the Darkot (15,000 feet).[1]

Captain Younghusband stumbled, in 1889, upon an imposing Russian cavalry force under the now famous Colonel Ionof (not Yanof). This fact, without even the recently reported Russian military operations on the Bam-i-Dunia, disposes of the idea that even a sparrow could hardly perch with safety upon the gable of the Roof of the World.

In the year 1878, M. Oshanin, passing from the Upper Zarafshan by Iskander-Kul lake, traversed an exceedingly difficult region with all his baggage animals. From Faizabad, in Bokhara, he scoured the Karateghin valley, a task requiring the greatest activity and power of endurance. And yet he executed the whole of his survey within one month, having left Samarcand on the 25th July (6th August), and entered Ferghana in the middle of August (beginning of September).

There is only the possible delay of a few days on account of snowfall, which can at any time obstruct the passage of any given number of men and beasts, either from Sokh by Daraût-Kurgan, in the Alai valley, or from Novo-Marghilan, Osh, and Gulcha, in Ferghana, over the Terek or Katin-Art pass to the Pamirs. In the face of all existing information, there is no gainsaying the practicability of the routes at any time of the year, as there is no gainsaying the fact that those routes over the Bam-i-Dunia afford numerous modes of access into Badakhshan and Kashmir, while they can all be made perfectly free from molestation on their flanks.

More than this: it cannot be denied by any competent authority that the great advantage of the Pamir routes lies in the interesting circumstance that they lead directly down by soft gradients from the Panj by Chitral and Dir to Jelalabad, cutting off Cabul from the Khyber.

Colonel Matveyef's rapid excursion in this direction in 1873 was suggestive enough; it throws a light upon Colonel Grombchefski's endeavours, and our military authorities have doubtless taken note of it.

And while on this topic we shall do well to consider that the opposing native influences, the powers of men in the regions of the Pamirs, as throughout Asia, are not what they were in ancient or in mediæval times. The manhood of the Central Asiatics was completely thrashed out of them by the Mongols in their headlong careers: now, even the energies of the Mongols have long been spent; the race itself is broken and dispersed, and falls easily under any authority. The effeteness of that people, like the tameness of the kindred populations of Siberia when the Russian Cossacks enthralled them in the fifteenth century, affords an excellent medium for the passage of a foreign spark of vitality; and it is well illustrated by the ease with which the Afghans occupied Shighnan and Roshan not a decade back, and with which even the Bokharian Uzbeg, Sarbaz, subdued the inhabitants of Darvaz and Karateghin in 1875. On all those occasions native guns were dragged up into the hill country without let or hindrance, with merely a little improvement of the

[1] Otherwise the Karumber. See Dauvergne's "Explorations, etc.," *Bulletin*, 1er trimestre, 102, tome iii. pp. 33-37.

roads. So the Afghans constructed a road in 1885 through Badakhshan to Kila-Wamar, where there had not been one before.

There is no question but that Russian cavalry and field artillery can, with a little labour, and certainly with far greater ease than was the case with Lord Napier's horse, guns, and transport in Abyssinia, be planted on the grassy downs of the Baroghil within the space of time of an Oshanin journey, or of the one projected by the late M. Fedchenko.[1]

With what punctuality and ease, for instance, the amiable and courteous Russian friend (Colonel Ionof, to wit) of Mr. and Mrs. Littledale followed that English party up with the promised grain caravan to Kara-Kul, where they found it had already arrived when they reached the shores of the lake.

Taking Novo-Marghilan as a base, the Russians may have Daraût-Kurgan (8000 feet) as a depôt in the Lower Alai valley. From this place they can move on to Altyn-Mazar on the Muk-Su affluent of the Karateghin river (elevation 8500 feet).

They may also advance through Osh and Gulcha in Ferghana, over any one of a chain of numerous passes (from the Alaùdin westwards to the Terek-davan there are more than twenty-five) into the Upper Alai valley, and by the Kizyl-Art across the Trans-Alai Mountains to the Great Kara-Kul.

Skobelef's column marched in three detachments from Kokand. From the Muk-Su and from the Kizyl-Art there are three parallel routes emerging on the Southern Pamirs.

I should have premised that the situation of Kokand, at the outset, is at an elevation of from 3000 to 4000 feet. Thus Vadil town is 2800, and Shah-i-Mardan 4400 feet high.

This at once does away with the erroneous idea of any "prodigious" elevation of the Bam-i-Dunia, especially when we realise that the head-waters of the Raskem and other streams run placid courses at altitudes of over 10,000 feet.

The highest passes are those on the eastern confines of the Bam-i-Dunia, like that of the Ilyk, leading down from the Tagh-dum-Bash into the basin of the Raskem, which, according to Colonel Grombchefski, is 15,770 feet above sea-level.[2] This pass does not, however, lie on any route to the head-waters of the Oxus, but on that leading into and from Little Tibet—a direction eastwards, and having no particular bearing on the subject of this paper.

From Altyn-Mazar, the way trends up the course of the Belen-Kiik river, emerging on the one hand into the basin of the Great Kara-Kul by way of the Kokui-Bel Pass, and on the other hand leading down to the Bartang river in Roshan. On this line of country occur the Taghda-Korum pass, 15,480 feet, and a much lower and alternative pass, the Yangi-Davan.

[1] This, as all the rest, was written before receipt of the reports from Simla of Colonel Ionof's presence and operations on the Alichur and elsewhere.

[2] Captain Younghusband, performing a rapid excursion to the Tagh-dum-Bash from the Raskem, in October 1889, traversed a pass here only 14,600 feet high; but Grombchefski at the same time crossed the Ilyk with yaks when there was snow upon the pass.

Detachments following these branching courses are at several points in touch with a body moving down along a parallel track from the Great Kara-Kul, which, passing by the Kurun-Kul (lake), 13,100 feet, descends the Kokui-Bel stream to Yangi and Polis, in the rich Kudara valley of Roshan. The Kudara is an affluent of the Bartang, and joins that river a little above Afghan Tash-Kurgan. This last route also branches off directly to the south by way of a lake, and crossing the Kara-Bulak Pass (14,450 feet), emerges on the Murghab above Ceres. We are here, I believe, on the scene of a recent Russian violent encounter with Afghans.[1]

From the Kara-Kul, the main route traverses the Ak-Baital Pass (14,000 feet), descending the river of that name to the Ak-Su-Murghab. This is the main trunk road from north to south. From the Ak-Baital, there are many and various ways to the Alichur river and the basin of Yashil-Kul lake, *i.e.* the head of the Ghund: the highest pass here, viz., the Buz-Terek, being about 14,900 feet, and the highest alternative pass, the Niza-Tash, only 13,800 feet.[2] Every one of the passes hereabouts has been traversed by Russians in considerable numbers and at various seasons, and they are in common use with the itinerant *Sartaghars* (hill pedlars), who in dealings with the Kirghiz barter cheap wares for hides (sheep's), fat, felts, and flocks of sheep.

I have given here but a few indications of the ways southwards along the length of the Bam-i-Dunia, but quite sufficient, I think, for my purpose. The numerous Russian descriptions of the region give the particulars of many other cross- and by-ways, so that there is no necessity to waste emphasis on their availability.

As for the nature of the ground from the Alichur to the Pamir and Wakhan rivers, and to the Hindu-Kush, we have the cumulative evidence of British and Russian officers, of pundits and others, that the water-partings here are almost imperceptible.

I will now endeavour to invest the skeletons of my routes and subject with a little more substance, and try to impart some real life into the shadowy and mouldy picture of *Imaus*.

The framework of this picture will now be: on the north the Trans-Alai mountains stretching westwards, say from 74° E. long., and arching towards the sources of the Muk-Su river, between the parallels of 40° and 39° N. lat., whence, under the name of Goû, they turn abruptly to the south. This range, averaging in its total length a height of 18,000 feet, is considerably depressed from east of the Kizyl-Art, rendering that pass, if it can be called a pass, as easy as the Baroghil, which it resembles.

Between the Muk-Su and the Kizyl-Su (of the Alai valley) runs an inferior spur, with an almost imperceptible pass called Ters-Agar. The Ters-Agar stream flows in one branch southwards to the Muk-Su, and in another branch—the Altyn (gold)—runs north into the Kizyl below Daraût.

At the north-east corner of my framework rises a stupendous frozen

[1] See, with reference to Russo-Afghan amenities and contentions, my "Bam-i-Dunia," in the October number of the *Imperial Asiatic Quarterly*.

[2] Distinct from the pass of that name in the direction of Chinese Tash-Kurgan.

mountain mass called the Muztagh-Ata, and, skirting the eastern shore of Great Kara-Kul lake, I trace the meridional snow-capped Gurumdu chain, separated from the Muztagh-Ata, or linked to it, by the high flat valley of the Markan-Su, which runs to Kashgar.

Here, in this corner, is a series of Pamirs outside the limit of the horse-shoe.

From the Markan-Su in a south-easterly direction to the Tagharma peak, in the meridian of Chinese Tash-Kurgan, I draw the curve of the crenellated range of the Kashgar mountains (Erskine's *Casii Montes*), beyond which my picture does not extend.

From the Tagh-dum-Bash, in 37° N. lat., a mountain chain will be traced along 75° E. long., bending inwards towards the Great Kara-Kul till it culminates in a point under the 39th parallel some fifty miles east of that lake. The space between these two main meridional ranges embraces the Great Sari-Kol valley or Pamir, which contains the basins of the Little Kara-Kul and Bulun-Kul lakes, and, higher up, the valley of the Muji affluent of the Gez.

In the south-east corner rises the Tagh-dum-Bash, which may be cast in with the plateaux of Little Tibet. The north-west ramifications of the Kara-Korum Muztagh, with its gigantic glaciers, also fills in this corner; and the extreme eastern length of the Hindu-Kush completes on the south the setting of the Bam-i-Dunia—or the great reservoir of the waters which flow westwards to feed the Caspian alone. The immense wealth of these waters is expended in the wastes of the western half of Inner Asia, for it is the Sari-Kol Pamir alone, with the Tagh-dum-Bash, that supplies the water system of Eastern Turkestan.

The western face of the Roof of the World has no mountain prolongation to define its limits. With the exception of a few solitary longitudinal elevations, the crowning heights within the compass of the horse-shoe extend in a north-westerly direction; their butt-ends, broadly speaking, projecting on that side at acute angles with the line of the Panj or Oxus. Far short, however, of the Panj, at a distance of a degree of longitude, the western exits from the Pamirs afford vistas down into the grandly picturesque and luxuriant valleys of the Bartang and the Ghund, which form the Afghan province of Shighnan, inclusive of Roshan.

Slantingly, and in strong relief, I paint across my picture from ENE. to WSW., in colour of granite veins, and of red and grey sandstone, the main orographic features of the Wakhan, Alichur, and Murghab mountains.

We have, however, tolerably clear indications from various sources of the natural, as well as political, western limits of the Pamirs.

Glittering under the hot rays of a southern sun, my picture is here brightened with a broken streak of golden corn from Kila-i-Panj in Wakhan to Sardym-Charpak on the Ghund, by Ceres and Tash-Kurgan on the Murghab to far up the Kudara, and with a touch of the same on the Muk-Su at Altyn-Mazar. The points in the valleys so brightened by my colouring will represent elevations far exceeding 6000 feet. This margin of the picture I will now complete, applying rich pigments to paint a fruitful soil covered with verdure, shaded by the foliage of trees.

Here are groves in which Baber would have reposed in philosophic ease with the delight which he experienced in similar situations elsewhere. We are told of the luscious apricot in these sweet retreats, of the plum and the vine; of their embellishment with variegated clusters of roses, twining honeysuckle, and clematis.

Breaking it into sections, the Bam-i-Dunia is found to be composed of seven pamirs, besides the flat valleys of the Belen-Kiik, Kudara, Kokui-Bel, Ak-Baital, Rang-Kul river, and Ak-Su-Murghab.

The Pamirs are: the Kara-Kul, the Rang-Kul (so named, according to Russians, from a coarse sedge), the Alichur, the Great or Kalan, and the Little or Khurd, and along the length of the eastern margin of my picture the Sari Kol Pamir. The Kok-Yar district, containing the valley of the Kokui-Bel, may by its extent be considered an eighth—the New Pamir. It is entered from the north by the Taghda-Korum, and from Kara-Kul by the Kokui-Bel pass. The way south to the Alichur lies across the Kara-Bulak.[1]

All these are well-defined plateaux or grassy flats.

The great Kara-Kul Pamir has been identified with the Khargoshi, of which there are two, with a pass of that name; and these Khargoshis, like the locality above Ceres, are mere agglomerations of eccentric piles of rock, with gorges bare and wild, devoid of all vegetation, which have much to answer for in the stamping of the entire region with a false character of bleak desolation, and they alone may be likened to a "square mile of the moon or of Sirius."

These two Khargoshis serve to connect the Alichur with the Kara-Kul on the north and with the Great Pamir on the south.

The Sari-Kol Pamir cedes now to the Tagh-dum-Bash the allocation which was given it from the readings of Marco Polo, Benedict Goës, and Lieutenant Wood.

I proceed now with the colouring of the several Pamirs. This will be the brownish-green of the steppes; a bright, almost emerald, green over the downs of the Kizyl-Art and of the Baroghil; with purple and olive tints over the moist Rang-Kul; but I impart a somewhat colder and more sterile appearance to the Ak-Baital Valley and to the Upper Ak-Su in its meridional length, until we descend into the region of Wood's Lake and of the common sources of the Ak-Su and Pamir river. Here is a wide expanse of verdant pasture mirrored with shining lakes.

The sparkling streams and the crystal waters of the lakes of the Pamirs teem with trout, and many other varieties of fish; bristling in the early morning, even in the summer, with glittering icicles, until the powerful sun produces a transformation scene, discovering "the lace of peace's coat" in the gay hues of all the floral beauties of an Alpine zone.

Patches of a cold grey schistose, and of a yellowish-white crustaceous glauber, surface will show off to greater advantage the greater bulk of all this land; and if I be found to have been too lavish of my *couleur de*

[1] Although only 14,460 feet above sea-level, this was the most difficult pass (from the south) of M. Ivanof's experiences in 1883. From my reading of the Russian itineraries, I alter the relative positions on the map of the Kokui-Bel and Taghda-Korum, placing the former SE. of the last named.

rose, I will say that I have been provoked to this by the exhibition of a bare canvas as a fitting representation of the Bam-i-Dunia.

I need only to cap the higher peaks of the ranges with silver-white and cobalt[1] for snow and for glacial effects; and in order to give the Bam-i-Dunia a sense of great elevation, I will crown it with a cærulean sky, and give the whole a glazing of transparent blue to convey a feeling of rarefied and cold atmosphere, and a realisation of an Alpine zone.

This is almost enough to emphasise the great distinction between the Pamirs and the Tagh-dum-Bash with Little Tibet.

Nor, strictly speaking, is the Persian rendering of *Pamir*, or *Bam-ir*, into Bam i-Dunia applied or applicable to any part but to the superior elevation of the Tagh-dum-Bash and of Little Tibet. *Bam* is indeed *roof*, but *ir* in the Chagatai of the Kirghiz is *earth*—*terra* in its widest sense; so, whether Sir Henry Rawlinson's explanation of the etymology of the word, or any other, be the right one, the *crown of the world's head*, as meaning the highest land known to the people of Inner Asia, is the Tagh-dum-Bash—the crown of all mountains.

And yet a few more touches with my brush. I patch with a radiant colour the meadow lands of the Great Kara-Kul, the Istyk river, the Ak-su near the mouth of the Ak-Baital, the Alichur and its Pamir, the Little Kara-Kul basin, Muji,[2] and the Kokui-Bel, as laughing in the sunlight, with joyous waving of the tall—something like pampas—grass.

Towards the western escarpment—if I may be allowed to say so—the butt-ends of the mountains draw together, producing an intricacy of spurs and broken heights, with narrowing waters short of the valleys below, and creating a region "distinct from the meadowy Pamirs: there the rivers meander in wantonness over the wide (Pamir) swards," while "here the waters forge their way angrily through the rocks which press and which would impede them," cascading into the valleys, where they finally relax their wild fury.[3]

Each of the Pamirs—from the plains to the summits of many of the passes—may be likened to a *ranch*. The Pshart is itself a *down*, and a pet resort of the nomads. Kok-Yar is exceptionally rich in pasturage, being the permanent camping-ground of the once notorious Sahib-Nazar with his clansmen.

Lieutenant Wood observed on Lake Victoria that it was "a favourite resort of the Kirghiz, and no sooner is the snow off the ground than its banks are studded with their *kirgahs*. A spot better adapted," he wrote, "to the wants of a pastoral community cannot well be imagined, and the hordes that frequent it seem fully to appreciate its advantages, since they are never weary of expatiating upon them. The grass of Pamir, they tell you, is so rich that a sorry horse is here brought into good condition in less than twenty days."[4]

"A fine river" (the Pamir) "running through a plain clothed with

[1] About 17,000 feet, but these can hardly be said to occur within the horse-shoe, except one in Shighnan between the Bartang and Ghund rivers.

[2] This is just outside the northern point of the hoof, and hereabouts, with the eye of imagination, we may see the resistance offered by the Chinese to Colonel Ionof.

[3] *Proceedings Imp. Russ. Geog. Society*, 1884. [4] Wood's *Oxus*, p. 239.

the finest pasture in the world, insomuch that a lean beast will fatten to your heart's content in ten days."[1] "And its nourishing qualities," continues Wood, "are evidenced in the productiveness of their ewes, which almost invariably bring forth two lambs at a birth. Their flocks and herds roam over an unlimited extent of swelling, grassy hills of the sweetest and richest pasture, while their yaks luxuriate amid the snow at a very great distance above their encampment on the plains. . . . The willow of many varieties is found margining every stream," while Colonel Gordon and Russian explorers have found lavender species in every part at altitudes of 13,000 feet.

"Fruit-bearing trees," Wood continues, "of the plum species were found at an altitude of 10,800 feet above the sea. . . . The height to which the ground is cultivated by man I could not ascertain, the snow being upon its surface" (this was in the winter), "though from the nature of the soil upon the Pamir I can see no reason why a hasty harvest should not be reaped even there."

Let us imagine a very cold climate, biting west winds prevailing, and all the drawbacks of an exposed and elevated tableland equal in size to the plain surface of Portugal, covered with patches of drift snow; a temperature falling at night, sometimes even in June, to freezing-point; in which the warm months are only three—June, July, and August; and then, even, we need not shudder in the contemplation of it, nor wonder that any man can venture upon it or covet its possession.

The mineral wealth alone, the gold which is washed down the Ak-Su, Muk-Su, and other rivers to the old Oxus, its jade and other rare and costly stones, are in themselves not unlikely in the end to recompense those who shall have made the scientific conquest of the region and exerted themselves to smooth the ways across it.

A word now on the population of the Bam-i-Dunia.

The Kirghiz on the plateau within the horse-shoe are said to number only 3000. These are, however, only a fraction of the total number which properly belongs to the Pamirs, for the greater number are absent on the Chinese slopes of Kashgaria, and in employment in and between the towns and cities of Chinese Turkestan, as well as in Darwaz.

On the north are the Kipchaks, of whom the bulk reside in Kokand. Prior to the Russian occupation of that khanate, the Kipchak Kirghiz were ever masters of the situation in Ferghana, both before and after the slaughter of a large number of them, together with the execution of their head and chief, Mussulman-Kul, the then Khan's chief minister and his father-in-law—the Warwick or king-maker, at one time regent, in Kokand.

These Kipchaks were ever more controlling than controlled, and, combining with the Naiman clan, which was called down from the Alai on emergencies, always held their ground against the Uzbegs of the towns.

Never, according to Russian authorities from Nazarof to Khoroshkhin, whose *Notes on Kokand to the Memory of Avdief* were published in 1869, and up to the period of Skobelef's operations in Ferghana, did any Kokand *Zeketchi* or other delegate of the Khan of Kokand venture to claim from the Alai Kirghiz any taxes or tribute, nor even to levy the

[1] Yule's *Marco Polo*, vol. i. p. 181, 2nd edition.

toll or blackmail which these Kirghiz, on their own part, imposed on caravans from Kashgar and from other places passing into Kokand. Nor did any Kokand official of any kind exercise at any time any official function across the passes of the South Kokand and Alai mountains. Not one of them ever dared to show himself among the Kirghiz.

The governors of most of the towns, and certainly of all the strongholds in the south of the khanate, were Kipchak, Naiman, and other Kirghiz, and even these rendered no account of their finances or of their actions to the Khan: such were Bulat Bii, Batyr Khan, Sarymsak-Hodja, and others. No taxes were imposed even by these governors on the nomads beyond the mountains, and the latter were never invested by the Khans of Kokand with patents of authority.

"In Kokand," Khoroshkhin wrote—and he is the chief Russian authority on Kokand—"the Kipchaks are all enemies of the Khan to the death. The *Datkha* of the Kirghiz on the Jumgal and around Andijan are not in accord with the Khan, and those of the Issyk-Kul absolutely repudiate his authority. They very indifferently acknowledge any authority, that of the Russians included. Nor is this strange: the Khan's case is our case, and it has ever been so in the case of the Kashgarians and the Chinese." Here M. Khoroskhin was somewhat out of his depth; we have it as a positive fact, coming within the experience of English as well as of Russian officers, that the Chinese did exercise authority on the Pamirs, having outposts in those regions to exact the obedience of their nomad subjects.

But Khoroshkhin proceeds: "The means are lacking to influence the wild, warlike tribes in their inaccessible mountains." For further particulars, reference may be made to Veniukof's treatise on the Dikokamenni Kirghiz.[1]

M. Fedchenko was not allowed to pass across the South Kokand and Alai mountains because of the absence of Kokand authority among the Kirghiz beyond them, and he succeeded only by securing the favour of some influential men of those independent tribes.

The notices on Kokand which have appeared in the Russian language are a sufficient and quite conclusive answer to any Russian claims to the allegiance of any of the Kara-Kirghiz of the Pamirs.

This is the picture of the Bam-i-Dunia which I humbly offer to the contemplation of the public. Although it is a picture of the hoary *Imaus* of Herodotus, it is not an "old master;" it is not even a modern original, but a mere copy—perhaps in too lively colours, but still a faithful copy—of word-paintings by all the explorers during the last twenty years; and in making this acknowledgment I cannot find it in my conscience to lay down my brush without making due recognition of my obligations to those Russians upon whom I have drawn so very largely, and such recognition is due notably to M. Ivanof.

It is incumbent upon me to say thus much of my obligations, seeing that I have not used many inverted commas in the modern part of my subject, or made many marginal references to my Russian sources as to actualities of the present.

[1] *Vide* J. and R. Michell's *Russians in Central Asia*, chap. vii. pp. 271-277.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

The Annual Business Meeting was held in the Society's Hall, Edinburgh, on Monday afternoon, 14th November, at 4 o'clock. Colonel Dods presided.

The following Resolutions were adopted :—

1*st*. On the motion of Mr. Coutts Trotter, "That His Grace the Duke of Argyll be re-elected President for the current Session ; and that the Vice-Presidents of the Society be re-elected."

2*d*. On the motion of Colonel Sconce, "That the Honorary Office-bearers of the Society be re-elected for the current Session."

3*d*. On the motion of Mr. J. B. Sutherland, "(*a*) That in room of Dr. H. R. Mill and Dr. George Merry, who have resigned their seats, the following gentlemen be requested to serve on the Council :—The Hon. John Abercromby and the Rev. Dr. Colin Campbell ; (*b*) that the following 12 Members of Council retiring by rotation be re-elected :—Mr. Wm. C. Smith, Dr. Buchan, Dr. W. Scott Dalgleish, Colonel Dods, Dr. Felkin, Mr. Coutts Trotter, Mr. H. M. Cadell, Mr. Charles Robertson, Dr. W. G. Blackie, Sir W. Renny Watson, Mr. W. O. Dalgleish, and Lord Provost Stewart ; and (*c*) that in room of the eight other Members retiring by rotation, the following gentlemen be requested to serve on the Council :—Mr. T. R. Buchanan, the Right Hon. J. A. Russell, Lord Provost of Edinburgh, Captain Hamilton Dunlop, R.N., Dr. J. J. Rogerson, the Rev. Dr. Stewart, Mr. John Stephen, Mr. Victor Fraenkl, and Professor Pirie."

The Secretary submitted the Annual Report of Council, which, on the motion of the Chairman, was adopted.

The Anniversary Meeting of the Society was held on Tuesday evening, the 15th November, in the U.P. Synod Hall, Edinburgh, when, on the motion of Colonel Dods, His Grace the Duke of Montrose was invited to preside. At the request of the Chairman, the Secretary read a letter from the Duke of Argyll, President of the Society, in which, after expressing his regret that he was unable to be present, His Grace strongly advocated the retention of Uganda. Captain Lugard, who was warmly received by a very numerous audience, then read a paper on 'Characteristics of African Travel, with Notes on a Journey from Mombasa to the Albert Lake,' which forms the first article in this number of the *Magazine*. Dr. George Smith proposed, and Professor Garden Blaikie seconded, a vote of thanks to the lecturer. The Chairman, after announcing that a Silver Medal had been awarded by the Council to Mr. Joseph Thomson for his distinguished services to Geography as an African explorer, presented Captain Lugard with the Silver Medal of the Society, in recognition of his work in Uganda as an explorer and pioneer of civilisation ; Captain Lugard also received the Society's Diploma of Honorary Fellowship. Captain Lugard having made the reply which will be found at the conclusion of his article, the proceedings were brought to a close by a cordial vote of thanks to the Chairman, moved by Dr. Felkin.

The Glasgow Branch of the Society held its Inaugural Meeting on Thursday, November 17th, when Captain Lugard narrated fresh incidents of his travels in Africa. The chair was taken by Sir W. Renny Watson. Mr. J. Parker Smith, M.P., moved, and Mr. Robert Balloch seconded, the vote of thanks to the lecturer. On the motion of Sir Michael Connal, Sir W. Renny Watson was thanked for presiding.

On November 18th Captain Lugard opened the Session of the Aberdeen Branch, in the Queen's Rooms, the Lord Provost occupying the chair. A vote of thanks was awarded to the lecturer on the motion of Lord Forbes, seconded by Professors Pirie and Ramsay.

On Monday evening, November 21st, the members of the Dundee Branch assembled to hear Captain Lugard in the University College. The Right Hon. the Earl of Camperdown presided, and a vote of thanks to the lecturer was moved by Mr. W. O. Dalgleish, and seconded by Mr. John Leng, M.P. A vote of thanks to the Chairman, moved by Captain Clayhills Henderson, R.N., terminated the proceedings.

GEOGRAPHICAL NOTES.

By W. A. Taylor, M.A., F.R.S.E.,

Librarian, R.S.G.S.

EUROPE.

The Lakes of Central France.—M. A. Delebecque has studied eleven lakes, and drawn up hydrographic charts of their configuration. The deepest is the Lac d'Issarlès, in Ardèche, taking the third place in Europe after the lakes of Geneva and Bourget. Its basin, which is very regular, has an area of 227 acres and a depth of 356 feet. It appears to have been formed by a subsidence of the granite. The lakes of Pavin, Chauvet, La Godivelle, Bouchet, and Servière (Puy-de-Dôme) are crater basins of very regular form.

A New Type of Cave.—Monsieur E. A. Martel, so well known for his subterranean explorations, has re-discovered a long-forgotten cave, which is quite unique in character. The opening into the Creux de Souci is a funnel-shaped shaft in basalt rock, at the bottom of which a small passage, 13 feet in diameter and 8 feet long, leads into a large cavern, in shape like an inverted funnel, and 160 feet in length. Were the rock limestone, there would be no difficulty in accounting for the form. In basalt, however, no such cave has been found, and its formation can only be accounted for by the evolution of gas. It is further singular that at the bottom of the cave there is water, with a layer of gas (M. Martel says carbonic acid) above it. The questions then arise, whether the basin of water is connected with a spring, and whether the water itself contains carbonic acid, or whether the gas escapes into the cave from the depths of the earth. In any case volcanic action has certainly been at work. The temperature falls remarkably quickly, for, while the air without was at 51° F., at 8 feet below the mouth of the opening 40° F. were observed; at 13 feet the thermometer sank to 36°, and at 65 feet to 34°. The temperature of the water at the bottom was 35°. This low temperature was observed in an earlier examination of the cave, and is probably due to the evaporation of the water.—*Petermann's Mitt.*, No. 10.

Mittellandkanal is the title given to a new canal, now in course of construction, which will traverse North-West Germany from west to east, and connect the Rhine with the Weser and the Elbe. From Ruhrort it will run through Münster, and, crossing the Weser at Minden by means of a bridge 50 feet high, will pass by Hanover and Lehrte and join the Elbe near Wolmirstadt, below Magdeburg. Branch canals will be carried to the Lippe, to Ems, Osnabrück, Brunswick, and

other places. The length of the main canal will be 294 miles, and with the side canals 404 miles. The breadth will be 98 feet at the surface, narrowing down to 59 feet at the bottom, and the depth will be 8 to 10 feet. The section Dortmund-Emshafen is now being constructed, and the whole canal will probably be finished in 1900.—*Globus*, No. 13.

The Simplon Tunnel.—This tunnel, which will be the longest in the world, is now in course of construction. The northern opening is situated at a distance of about 1¼ miles from Brieg, and the southern three furlongs beyond Ivelle, the length between these points being about 12½ miles. On the Swiss side the river Marsa will be tapped to obtain power to work the boring machines, the dynamos for electric light, and the ventilating fans, while the Clairasca will render similar aid on the Italian side. The work will cost £3,200,000, and will not be completed in less than eight years. The passage of the tunnel will take three-quarters of an hour, whereas to cross the pass by the road eight or nine hours are required.—*Le Mouvement Géographique*, No. 25.

The Italian Surveys.—The Istituto Geografico Militare has fixed 366 stations in Italian territory on which to base a series of primary triangles, connected with the continent of Europe across the Alps and Adriatic, and, on the other hand, with Africa through the island of Pantelleria and Cape Bon. Up to the present eight bases have been measured. 343 of the stations had, up to 1890, been connected by triangulation, and to these six more were added in 1891. The remainder will probably be connected during the next three years. The adjustments of the Sardinian system to the continental network, and that of Sicily to the island of Malta are contemplated, but must, of course, be preceded by international agreements. The topographical survey for the construction of the new map of Italy is now complete, except in Sardinia, and 11 sheets on the scale 1 : 100.000 were published in 1891, the total number being 277. Levelling operations have been carried out with a highly satisfactory degree of precision. The lines chosen have been measured twice, and in a perimeter running from Genoa through Spinetta, Moncalieri, Cuneo, Savona, and back to Genoa, a length of more than 400 kilomètres, the difference of altitude at the extremities was about 5 centimètres (about ·118 inches in over 248 miles). A line has been observed from Genoa along the Cornice road to the Ponte S. Luigi, near Mentone, with a result according with that of the French measurements, based on the mean-level in the port of Marseilles, to within 5 centimètres. Another junction with the French system has been effected by the Mont Cenis route, but the definite results have not yet been made known. The accordance of the Italian operations with the Swiss and Austrian surveys has proved to be also satisfactory. A series of levels carried from Genoa along the Po to Venice has proved that the levels of the Mediterranean and Adriatic do not differ materially, the difference observed not exceeding a decimètre, and, therefore, lying within the limits of probable error in a provisional survey. Up to 1891 lines of levels extending to a length of 300 miles had been surveyed, and in that year the work was continued over 354 miles. The publication of the results was commenced in the year 1889.—*La Geografia per Tutti*, September 30th.

ASIA.

The Levant.—The Austrian man-of-war, the *Pola*, has made some very interesting observations between Port Said and Larnaka. Professor Luksch reports that the temperature of the water and its salinity are exceptionally high, and its transparency most remarkable. With a surface temperature of 84°, the thermometer

sank only to 80½° at a depth of 16½ fathoms. The salinity reached as much as 4 per cent., and a disc 1 mètre (about 3 feet 3 inches) in diameter was visible at a depth of nearly 197 feet. On September 14th the *Pola* arrived at Larnaka, whence it was to steam along the coast of Asia Minor to Rhodes, returning home by the end of October.—*Petermann's Mitt.*, No. 10.

The Demavend.—Herr Sven Hedin has contributed an article on the culminating peak of the Elburz Mountains to the *Verhandl. der Gesell. für Erdkunde zu Berlin*, Bd. xix. Nos. 6 and 7. After describing former ascents of the peak, and referring to information collected by other travellers in Persia, he gives an account of his own expedition in 1890. The summit is covered with a large snow-field, which, like a huge star, sends out arms down the mountain side. Between these lie ridges composed of large and small blocks of trachyte, porphyry, tuff, and other volcanic rocks. The crater, elliptical in form, has a breadth of about 550 yards. It is of insignificant depth, and is filled with snow. Herr Hedin could find no sign of the activity mentioned by several previous travellers. From Call's description Dr. Tietze came to the conclusion that the Bemshibend peak on the northern side was a remnant of an older crater wall. Of such a wall Herr Hedin could find no trace, but, having ascended from the southern side, he is not prepared to deny its existence: where he sought for it, it may have been removed by erosion. From the readings of three boiling-point thermometers the height of the mountain was ascertained to be 17,925 feet. The former determinations varied from 17,961 to 21,513 feet.

AFRICA.

Tripoli.—The Belgian Consul states that between the two commercial centres, Tripoli and Benghazi, 358 miles apart, communications are rare. No line of steamers touches regularly at Benghazi, and there is no telegraph to that place, while the journey by land takes twenty days on camel's back, and the route is almost impracticable in parts owing to the large number of unhealthy salt marshes. Tripoli trades with Austria, Algeria, and Turkey, and even with Great Britain and the United States, and is the centre whence caravans start for Fezzan, Ghadames, Bornu, and other Central African States. Benghazi trades with Malta and the Levant, and sends out caravans to Wadai and Darfur. Esparto grass is shipped for England at several ports, and Misurata also exports dates, eggs, apples, etc. Benghazi deals in cereals, dates, skins, wool, and live stock. Tobruk, nearly 250 miles beyond Benghazi, has, perhaps, the largest harbour in the Mediterranean, but it is completely abandoned.

Near the western frontier of the State lies the lake of Brega, separated from the sea by a strip of ground little over half a mile broad. The area of the lake is about 124,000 acres, and from, perhaps, 75,000 acres most excellent salt might be extracted. The work might be carried on from June to November, and during this time sufficient salt might be transported to the coast to load vessels at all seasons. The road to the lake is good, and ships can anchor safely off the coast.—*L'Afrique*, September.

Italian Soundings on the Red Sea.—The *Scilla*, which has lately returned to Italy after a cruise in the Red Sea, usually found depths of from 270 to 440 fathoms. The deepest soundings were 885 fathoms, in 23° 11′ 30″ N. lat. and 37° 3′ 40″ E. long., and 673 fathoms in lat. 21° 14′ 15″ N., and long. 37° 57′ E. It was ascertained that the water at the depth of 80 fathoms was, as a rule, warmer than at the surface, and colder below 245 fathoms. Stations for measuring currents and tides were established at the islands of Diseï, Nakhrah Khor, and Shumma and

Mandola, and near Ras Gablado, Arafali, and Massaua, where hourly observations were taken both by day and night. Dredging operations were carried out with great success, and the positions of certain banks and islands ascertained more exactly.—*La Geografia per Tutti*, August 31.

Jebuti.—On p. 331 it was announced that the seat of government of the French colony on the Red Sea was to be removed to Jebuti. From this town the road is comparatively short to Harrar, 155 miles, and to Ankober, 404 miles. There is water all the way, and grass for beasts of burden. Towards the end of 1880 a French firm established a factory at Jebuti, which was the first house of a town that now contains, as nearly as can be estimated, 2000 residents and a floating population at times very considerable. Whereas, in 1888, the port was visited by only 57 Arab dhows and 4 French boats, in 1891 the number of the former was 502, and of the latter 22, besides 8 British vessels. Compared to the shores of the Red Sea in general, the country round Jebuti is pleasing. In climate also it has the advantage over Obok. At the latter place it is warm even in February, whereas at Jebuti the temperature is still moderate, and even in summer the wind from the desert is rendered fresh and is relieved of its sand during its passage across the gulf. It is said that King Menelik is willing to bear the expense of laying a telegraph line between this town, Harrar, and Shoa.—*L'Afrique*, September.

AMERICA.

East Greenland.—The *Verhandlungen der Gesell. für Erdkunde zu Berlin*, Bd. xix., Nos. 6 and 7, contain fuller details concerning the Ryder expedition than the source from which the note in last month's *Magazine* was taken. Hekla Harbour is on "Denmark Island," and its longitude is given as 26° 11′ W. Seventy miles from the sea Scoresby Sound branches into two arms, which run to the south-west and north-north-west respectively, each breaking up again into numerous narrow fiords, where glaciers descend from the inland ice to the water's edge. The largest iceberg measured had a volume of 22,000 million cubic feet. The western ramifications of the fiords extend to 29° 50′ W. longitude, the inland ice begins at 30°, and the last *Nunataks* were observed at 31°. Hurry's Sound proved to be closed at the north, so that Liverpool Coast is connected with Jameson's Land. In the interval from March to June three sledge journeys were made, in which nearly 540 miles of ground was traversed. No Eskimos were met with, but at seven different spots deserted houses, graves, and implements of bone and stone were found. Twenty-seven bears were killed, and foxes, musk oxen, and reindeer were plentiful. The vegetation, even in the proximity of the inland ice, was strong and healthy, birch and willow bush growing to a height of 18 inches. The prevailing rocks are gneiss and granite. On the south side of Scoresby Sound these are covered by a layer of basalt, which diminishes in thickness towards the inland ice, so that the geological formation is very similar to that of the west coast in the same latitude. The sun was invisible from November 14th to January 30th. Heavy snowstorms occurred in September and October, but the snow was quickly melted by storms from the south. The mean temperature was 30° F. in September, and sank to —14° F. in March: the minimum, —52° F., was recorded in the latter month. During the greatest cold the air was always calm and the weather clear.

Canada.—A survey has been made for a railway from Quebec to Labrador. It will be 850 miles long, and will terminate at Port Manham on St. Lewis Inlet, 60 miles north of the Straits of Belleisle. Port Manham has a magnificent

harbour, open to navigation during seven or eight months in the year. It is maintained that from this point fast Atlantic steamers could run to Milford Haven in 72 hours. The route presents no obstacles to construction, and it is estimated that the line could be completed in 18 months.—*The Colonies and India*, August 20th.

A Singular Lake.—In the southern part of Webster County, Missouri, where the Ozark mountains attain their greatest elevation, a lake begirt with banks 50 to 100 feet high lies on a peak. It has no visible feeding or draining channel, and there is no place of equal height within a radius of 100 miles from which water could flow into it. Yet the surface of the water in this wonderful basin rises and falls at certain intervals a height of over 30 feet. The Devil's Lake, as it is called, lies in a hollow about an acre in extent, not far from Fordland, a station on the Kansas City, Fort Scott, and Memphis Railway. The height of the water does not seem to be regulated by atmospheric conditions, for it is often at its lowest after long rains, and highest in the dry season. Nothing certain is known about its depth, but it it said that a man once dropped in a line when the water was low, and sounded nearly 100 feet. There is a report that some years ago a carpenter found several large logs of cedar in the water, a tree which does not grow to a great size anywhere in the neighbourhood. The lake lies at an altitude of 1600 feet.—*Deutsche Rundschau*, Jahrg. xiv. Heft 12.

The Rainfall of Trinidad.—During the thirty years ending in 1891 the mean annual rainfall has been 65·91 inches. There has been a continual diminution in the quantity of rain, the first decade showing 7·12 inches more than the second, and the second 9·56 inches more than the third. The question of the rainfall is an important one as connected with the vegetation and water supply. It is remarkable that in Trinidad there is often heavy rain with a high barometer.—*Globus*, No. 74.

Guatemala.—The British Minister in this Republic, Mr. Audley Gosling, states in his last report that, with the accession of General Barrios to power, there has been a marked revival in trade. Public confidence has been restored, and, consequently, the banks have reduced their rate of discount, and bonds of every description have risen in price. During the past five years the imports have been steadily increasing, and their value is believed to be about a million and three-quarters sterling. Of the principal export, coffee, 52½ million pounds were sent abroad last year, and the production of sugar, which was nearly 5 million pounds, might easily be quadrupled. There is a great field for foreign enterprise in the cultivation of these plants, and during the last twenty years considerable fortunes have been realised by foreigners in this industry. The production of tobacco, owing to the primitive methods employed, is still in its infancy. It can be grown successfully in nearly all parts of the country, as also bananas, sarsaparilla, and vanilla, which are suitable for small capitalists. Dairy farming should also pay well, and there is any quantity of available land in the neighbourhood of the chief towns to be purchased at moderate prices. There is a marked improvement in the trade between Great Britain and the Central American republics, especially with Costa Rica; and probably by the end of the year British exports to these countries will have increased considerably.—*The Colonies and India*, Aug. 20th.

ARCTIC REGIONS AND OCEANS.

Dr. Nansen's latest Plans.—In a paper read before the Royal Geographical Society, on Nov. 15th, Dr. Nansen set forth the physical conditions which induce him to infer the existence of a current passing from east to west over, or near, the

Pole, and described the vessel which has been built for the expedition and other arrangements that have been made. A current of great volume, with a breadth of 270 nautical miles, flows southward between Greenland and Spitzbergen, carrying, according to Dr. Nansen's calculations, between 80 and 120 cubic miles of water every 24 hours into the Atlantic. The southward current between Spitzbergen and Franz Josef Land is insignificant in volume compared to the Greenland current; nor can the body of water flowing southwards through Smith Sound, Jones Sound, and Lancaster Sound, in the Arctic archipelago of North America, be of great importance, owing to the shallowness of these channels. As, then, the Polar basin must be drained principally by the first-mentioned current, it is a question of prime importance to the Arctic explorer by what channel, or channels, this vast quantity of water finds its way northwards. A small branch of the Gulf Stream runs northward along the west coast of Spitzbergen, but it is of no great volume, and part of it certainly rounds the north coast of Spitzbergen, and returns southward by the east coast. The main Norwegian branch of the Gulf Stream passes to the north of Norway eastwards, entering the Polar basin to the north of Novaia Zemlia, and is so considerable that, according to Professor Mohn, it carries at least 60 or 70 cubic miles of water into the Arctic Seas every 24 hours. Next in importance is the current which flows from the Pacific through the Bering Strait. Very little is known of the speed of this current, but it may be assumed, from the latest descriptions, that it discharges 10 to 14 cubic miles of water daily into the Arctic Seas. To these sources of supply must be added the discharge of the rivers on the northern shores of America and Siberia. Their drainage-area is very considerable, but receives no great fall of rain and snow. In Siberia Dr. Nansen calculates from Russian data that the total fall cannot amount to more than 626 cubic miles in the year. Allowing for evaporation, he estimates the volume of water contributed by the rivers at about a cubic mile daily throughout the year. Small, however, as this addition is when compared with the vast discharge of the ocean currents, it has considerable effect in clearing the adjoining sea of ice and producing northerly surface currents, consisting, as it does, of comparatively warm and fresh water of less specific gravity than the saline waters of the ocean. There are, consequently, during the summer, large stretches of open water along the north coast of Siberia.

A glance at a North Polar chart shows that the centre of the arc along which these various sources of water-supply open into the Polar basin lies to the north of the New Siberia Islands. Here, then, the maximum effect of the great influx of water may be looked for. The current that here runs northwards has already been discussed by Captain Hovgaard (*S.G.M.* vol. vi. p. 25) and in two or three notes. The ice-floe bearing stores from the lost *Jeanette*, and the thickness of the ice in the East Greenland current, have also been referred to. Dr. Nansen was, however, able to point to some new and interesting facts confirming the former evidence. During his last journey to Greenland he collected samples of dust and mud from the ice-floes between Iceland and Greenland. These were submitted for examination to Dr. A. E. Törnebohm of Stockholm, who could account for the presence in them of minerals indicating that they were derived from crystalline sediments, which are rare in Greenland, and the large admixture of organic matter, only by the supposition that the mud had been formed by Siberian rivers. Still more striking is the evidence furnished by diatoms found in some samples of dust from the snow on the floes. Professor Cleve of Upsala determined 16 different varieties, all of which are found at Cape Vankarem, and 12 of them in no other part of the world. Of the existence, then, of a current flowing from the vicinity of the Bering Strait to the east coast of Greenland there is abundant proof.

To this current Dr. Nansen intends to intrust himself in the *Fram*, the vessel which has been built for him at Laurvig. She is just large enough to accommodate twelve men, with provisions for five or six years, and the necessary fuel: her displacement is about 600 tons, and an engine of 160 horse-power will give her a speed of six knots with a consumption of $2\frac{3}{4}$ tons of coal a day. With sails only she will, probably, attain a speed of eight or nine knots in favourable weather. In shape she is very similar to a buckie-boat, her hull being plump and rounded, so as to elude the grasp of the ice, and both her ends pointed. She is, however, carvel-built, and her bottom is comparatively flat near the keel, which does not project far from the body of the vessel, so that she will not capsize if lifted clear on to the ice. The sides are 28 to 32 inches thick, and are formed of solid pitch-pine, oak, and greenheart. The vessel is rigged as a three-masted schooner. Her length is 128 feet, decreasing to 113 feet at the water-line, and her greatest breadth 36 feet: with a light cargo she draws 12 feet of water. The propeller and rudders may be lifted into wells so as to avoid the ice. It is expected that when the open sea is left behind a portion of the coal will remain unconsumed, and may be used for heating purposes: petroleum will also be carried, and light will, as far as possible, be obtained from electricity.

It was originally Dr. Nansen's intention to make for the New Siberia Islands by Bering Strait, beyond which, in autumn, a passage called The Hole is opened in the pack to the north of Herald Island (see vol. vi. p. 321). What considerations have induced him to choose the route through the Kara Sea instead, Dr. Nansen did not state—at any rate, neither *The Times* (Nov. 15th) nor *Nature* (Nov. 17th) reports them. The change of plan seems, however, prudent, when it is remembered that the *Jeannette* took 21 months (from Sept. 2nd, 1879, to June 9th, 1881) to drift from lat. 71° 35′ N. and long. 175° 5·8′ W. to 77° 14·3′ N. and 156° 7·5′ E. Moreover, as the last forward drift of this vessel, in June 1881, was also the quickest, it will probably be advisable to enter the pack further to the west, where the current is stronger. There would also be more chance, if Dr. Supan's theory be correct (see vol. vii. p. 671), that a vessel, as it drifted, would remain on the Atlantic side of the wind-parting. Dr. Nansen will start next spring, and on reaching the Lena delta will wait for the right moment to go northwards along the west coast of the New Siberia Islands. The current from the Lena appears to have great influence in summer, and probably in August or the early days of December the sea may be open for a considerable distance northward. When the party can sail no further, they will run the *Fram* into the ice at the most favourable spot, and trust entirely to the current. In case the vessel, in spite of its form, should be crushed, two large boats, 29 ft. long and 9 broad, have been provided, which can be lowered on to the ice, and will afford a shelter to the men as they drift across the Polar Sea. When they emerge into open water there will be no difficulty in returning home in these boats. A delay may be caused by the ice at the entrance of the Kara Sea, and head winds will very likely be encountered along the north coast of Asia (see Dr. Buchan's Charts).

Arctic explorers have maintained that the Pole can only be reached with safety by following a coast line, and Sir George Nares repeated this opinion at the meeting of the Royal Geographical Society; but Dr. Nansen answered that he was fully prepared to dispense with a line of retreat.

The Expedition of the "Gazelle."—The results of this expedition have now been published in four large quarto volumes. In the first part is given a narrative of the voyage, by Admiralitätsrat Rottok. Steaming along the coast of Africa and past Loanda, the vessel reached Kerguelen Island on October 26th, 1874, where

SKETCH MAP OF ARCTIC REGIONS
SHOWING DR. NANSEN'S PROJECTED ROUTE.

the party sent out to observe the transit of Venus in December was put on shore. The delay there, extending to the end of January, was turned to good account in a thorough survey of the group. On the return journey the members of the astronomical expedition were landed at Mauritius, and the vessel then turned her head eastwards, and visited Amboina, New Guinea, New Hanover, New Mecklenburg, and New Pommerania (New Britain). The scientific exploration ended with a visit to Auckland, and a short inspection of the Fiji, Tonga, and Samoa Islands, and then the *Gazelle* started on her homeward course to Kiel through the Straits of Magellan. To the short sketch of the voyage are added notices of the most important additions made to our knowledge in geography, hydrography, ethnography, and anthropology. Physics and chemistry furnish the material for the second volume, in which are enumerated and discussed the soundings taken during the voyage, and the observations of temperature and currents, and of the colour and transparency of the sea-water. One hundred and thirty-two soundings were taken, the deepest, 3071 fathoms, being in the South Atlantic. While the vessel lay-to for soundings to be taken, the colour and transparency of the water were tested, and from the results Freiherr von Schleinitz, captain of the *Gazelle*, inferred that the colour was intimately connected with the salinity. As regards the latter it was shown that the specific weight of the water of the ocean decreases in the lower depths. Dr. v. Gümbel has investigated the mineral and geological features of the specimens collected from the ocean-beds, and Professor Börgen has reported on the observations of tides and waves. The maximum waves encountered were 43 feet 3 inches and 46 feet 7 inches high. In the portion of the work devoted to zoology Professor Studer has endeavoured to ascertain the conditions under which the organisms are able to exist, instead of giving merely a list of individuals and species. Perhaps the chapter on pelagic fauna most deserves special mention. Next follows the description of the botanical specimens brought home by Dr. Neumann, and in the last part of the work Professor Neumayer has condensed the meteorological material. The observations taken daily were:—(1) Position of the vessel ; (2) Its motion ; (3) Wind ; (4) Barometer ; (5) Temperature of the air ; (6) Vapour tension ; (7) Clouds ; (8) State of the sea (temperature and specific weight) : (9) General remarks ; (10) Proportion of ozone in the air. The anemometrical readings on board the *Gazelle*, and the meteorological observations at the Kerguelen and Auckland Islands, are recorded in a separate chapter. At these stations, also, magnetic measurements were taken, and the length of the seconds pendulum ascertained.—*Petermann's Mitt.* Bd. 38, No. 9.

New Soundings in the Pacific Ocean.—An American vessel, the *Mohican*, has made a series of soundings in the neighbourhood of the Pribyloff islands, and in the Bering Sea between 55° 50′ and 58° 19′ N. latitude, and between 168° 52′ 25″ and 172° 12′ 5″ W. longitude. Numerous and sudden changes of level were discovered. The shallowest waters were 3 to 5 fathoms, and the deepest 125 to 148, while the mean depth was 27 fathoms. The nature of the bottom is very varied : sand, rock and mud alternate repeatedly.—*Annales de Géographie*, October 15th.

MISCELLANEOUS.

A party of engineers will shortly start from Mandalay to survey the country through which the **Mandalay-Kunlon Railway** is to run. Mr. F. R. Bagley has been appointed chief engineer.

M. Léon Diguet has returned to France after explorations in the south of **Mexican California.** He travelled from Mazatlan to Mexico on horseback, through Guadalaxara and Tepic.—*Revue Française et Exploration*, October 15th.

A proclamation by the Imperial Commissioner has been issued, declaring that Finschhafen in **New Guinea** will be closed as a port for foreign trade, and that Stephansort and Friedrich Wilhelmshafen will henceforth be the recognised ports. —*Nachrichten über Kaiser Wilhelms-Land*, Heft i., 1892.

A new trade route between **India and Persia** is coming into use. It passes by Beluchistan and Seistan, and the journey along it to Meshed occupies forty days. The distance is longer than by the Kandahar and Herat route, but the new route has other advantages and seems to be preferred by traders.—*Annales de Géographie*, October 15th.

Lieutenant Frederick Schwatka has recently committed suicide at Portland, Oregon. He made himself a name as an explorer by his march from Chesterfield Inlet to King William Island, in search of relics of Franklin, and by his journeys in Alaska. He was the author of *Along Alaska's Great River*, a work describing the Yukon.

MM. Rabot and Pouchet, accompanied by Herr Gratzl, an Austrian officer, have succeeded in reaching the island of **Jan Mayen** in the *Manche*. After circumnavigating the island, which has no anchorage, the *Manche* sailed to Spitzbergen and touched at the west coast. Important zoological and geological collections have been obtained.—*Annales de Géographie*, October 15th.

The first sixteen miles of the **Congo Railway** have been completed. This is by far the most mountainous and difficult part of the whole route, and the remaining 250 miles present no difficulties. Additional capital will be required, £1,000,000 being clearly inadequate for the construction of a line through mountainous country. An extension of time will also be asked for.—*Le Mouvement Géogr.*, No. 26.

It may interest many members of our Society to know that the Committee, formed under the auspices of the British Association "to organise an **Ethnographical survey of the United Kingdom**," have begun to make inquiries as to villages or districts in Scotland which are likely on investigation to yield interesting material. Their researches will be made under the following heads :—

1. Physical types of the inhabitants.
2. Current traditions and beliefs.
3. Peculiarities of dialect.
4. Monuments and other remains of ancient culture ; and,
5. Historical evidence as to continuity of race.

It is obvious that inquiries on these lines, especially in some of the remoter parts of Scotland, may yield many useful and interesting results.

On September 15th the text of the Damaraland Concession, which has been transferred by the sanction of the Government to the **South-West Africa Company**, was published in Berlin. The concession grants to the Company the exclusive right of searching for, and working, minerals in a district extending over two degrees of latitude and three of longitude, situated to the north and east of the territory over which the South-Western Colonial Company possesses mining rights. The Concessionaires have the right to do all things which may be necessary for the working of mines, and, in consideration of certain royalties paid to the Government, are to be exempt from any other taxation for a period of twenty years, after which they shall enjoy all relief in respect of taxation granted to any other persons in Damaraland. The absolute ownership of 5018 square miles of land is also granted to them free of cost, and various other privileges respecting water-supply, railways, etc., are secured to them.—*The Times*, September 16th.

In vol. vii., p. 98, Herr O. Jesse's observations on Luminous Clouds were described. As this phenomenon will not, probably, be much longer visible, Herren W. Foerster and O. Jesse invite, in the *Annalen der Hydrographie*, Heft ix., the assistance of observers during the next two years. It is important to notice the upper limits of the phenomenon, and, therefore, observations should be repeated, if possible, at intervals of a few minutes. The movements of the clouds should also be recorded with exactness, and for this purpose photography will be found useful. The diameter of the glass should be not less than one-fourth of its focal length, or the time of exposure will be too long, seeing that the clouds change their form and position with great rapidity. As the clouds may be composed of a particular gas, spectroscopic observations when the sun is low are also recommended, and this method is of peculiar importance at about 70° of north latitude, because it appears that an exceptionally large quantity of cloud material collects there between the middle of June and the middle of July. Herr O. Jesse will shortly issue a work entitled *Die Lenchtende Nachtwolken.*

NEW BOOKS.

Brehm's Tierleben: Allgemeine Kunde des Tierreichs. Bde i.-iii., Die Säugetiere. Von Dr. Alfred E. Brehm, Unter Mitwirkung von Dr. Willh. Haacke neubearbeitet von Professor Dr. Pechuel-Loesche. Vol. i. (Monkeys, Lemurs, Bats, and Carnivores), pp. xliv. + 702, 19 Pls., 139 Figs. Vol. ii. (Carnivores, Insectivores, Rodents, Edentates), pp. xii. + 708, 19 Pls., 149 Figs. Vol. iii. (Ungulates, Cetaceans, Sirenians, Marsupials, Monotremes) pp. xii. + 744, 21 Pls., 150 Figs., 4 Maps. Gr. 8vo, *Bibliographisches Institut*: Leipzig and Wien, 1890-1891.

This well-known work has been for many years not only the delight of those who love animal life (and read German), but a treasure-house of knowledge from which naturalists have borrowed with more or less explicitly-grateful acknowledgments. In this, the carefully-revised third edition, the treasures have been re-set, and that in a manner so skilful that the original characteristics have been not only preserved but enhanced. Great praise is due to the editor, Professor Pechuel-Loesche, and to his *collaborateur*, Dr. W. Haacke, for they have been true to the spirit of Brehm; and not less credit is due to the artists by whose workmanship the text has been worthily illustrated, and to the wise liberality of the publishers, who have produced an edition of which they may well be proud.

The first edition of Brehm's *Tierleben* was published in 1863-69, the second in 1876; the new edition, begun in 1890, is still in progress, and will be completed in ten volumes. Like many other well-known publications of the *Bibliographisches Institut*, such as Kerner's *Pflanzenleben*, these volumes exhibit a marvellous combination of excellence and cheapness. The three volumes before us complete the description of Mammals; they form a total of over 2000 pages, 60 plates, 438 figures, and four sets of maps showing geographical distribution. The whole is a goodly treasure.

To criticise Brehm's *Tierleben* we cannot bring ourselves; we like it too well. We do not believe every one of the stories, for naturalists now-a-days are men of little faith except as concerns their own theories; we think that now and again an excusable enthusiasm has intruded too much of the man into the beast, but anthropomorphism ever besets us all, and few things are more difficult than the accurate use of psychological terms in describing the higher life of animals. We differ from the able editors in regard to some problems of classification, but both they and we

will admit that there is room for difference of opinion, and we are ungrateful enough to wish that some of the coloured plates had been left in black and white, though most are very beautiful and the technical difficulties are great; but the whole work is so fine, alike in matter and in execution, that it requires no generosity of disposition to welcome it with unreserved admiration.

As is well known, Brehm's *Tierleben* is not a technical work on Zoology. It is a description of the "higher physiology" of animals by one who never thought of them except as living creatures. The original work was often criticised, but usually by hide-bound taxonomists, who forgot the preface, and looked in the work for material which was deliberately excluded. It professed to give an account of animals as individuals at home, at work, at war, and at peace, in pairs, in families, and in societies, and what it professed to do it did well. The new edition under competent editorship is even better, and that is saying much. And although the characteristic of the book is to be found in its vivid picturing of the habits of animals, it must not be supposed that there is any lack of precision in the descriptions of external form, or in such references to internal structure as have been deemed necessary.

To the memory of Brehm we desire on this occasion to offer our respectful tribute. He was the son of a German pastor renowned as an ornithologist; from his earliest years he was wont to roam in the forests of Thüringen; both inheritance and environment combined to make him a naturalist. After serving his apprenticeship as an architect (what lessons of precision and method may he not have learned in that apparently irrelevant discipline?), he soon returned to his first love. He travelled far and wide—in Africa and elsewhere—collecting and observing indefatigably; he was Superintendent of the Hamburg Zoological Gardens, and he founded the famous Berlin Aquarium; all his life, so far as practical exigencies allowed, he was among the animals which he loved and described so well. But he was a man of whom the world should have taken better care; he was too good to be forced to expend his energies in itinerant lecturing or in labours of organisation for which he was ill-adapted; he was too good to have been finally shattered by a course of fifty lectures in America. One cannot help wondering what the world might have gained if Brehm had been Darwin's next-door neighbour, and if Richard Jefferies, as naturalist-laureate, had been within hail of both.

Enough, however, of regrets. By his *Tierleben* Brehm left the world richer. He himself spoke of it as a *Haus-Schatz*, and such we have found it. But it is more than that. It is not only a book on which to educate the boy-naturalist; it is a book from which to re-edit "The Principles of Biology;" it is a *Welt-Schatz*.

Das Marokkanische Atlasgebirge. Quellenmässig dargestellt von Dr. P. Schnell. Mit Karte. (Ergänzungsheft No. 3 zu *Petermann's Mittheilungen.*) Gotha: Justus Perthes. 1892. Pp. 120.

This is a comprehensive description, worked out in very full and careful detail, of the region in question, but dealing almost exclusively with the great natural features of the country, the position of the various ranges with their spurs and outlines, and their geological history; the direction of the valleys which intersect them, and the gaps and breaks in the ranges through which the streams and occasional trade routes take their courses. Even the vegetable productions of the region are only casually mentioned in so far as they are influenced by its physical characters. Thus, whether a given district produces chiefly wheat or dates, the two principal staples, may depend on whether it is protected from the desert simoom by an unbroken mountain range, or lies exposed to its influence through a break in the chain; and, incidentally, political isolation or connection, due in the same way to

physico-geographical causes, is noted. There are *lacunæ*, of course, in the description, as, *e.g.*, in reference to the almost unknown country between the western Shott and the eastern extremities of the Atlas range ; but the writer has evidently done his best to minimise them. The three great distinctive features of North-West Africa, as the writer gives them, are : first, the Atlas Mountains, consisting of—besides the fragments of an ancient coast range—the three great parallel north-east and south-west ranges, each with numerous spurs and subsidiary chains of hills,—the Middle Atlas, Great Atlas, and Anti-Atlas (this last not appearing definitely on maps before the end of last century, and first made known through the explorations of Mr. Consul Jackson)—and parallel to these, and forming the southern boundary of the plateau, the long and singularly narrow range of Jebel Bani, reputed to be rich in minerals, and in pleasant fertile oases ; second, the plateau or depression of the Shotts and the Sbachs (whose levels, respectively, he puts at 1000 to 1400 m. and 800 m.) ; and third, the Sahel or maritime plains. He points out how distinctly the whole region belongs rather to the Northern than to the "Dark" Continent, as is well shown at its western extremity, where the Jurassic rocks of Ape's Hill are almost in contact with those of Gibraltar ; and although to the eastward the connection is severed by various geological changes, and by greater distance, it is not less plain, for the eocene and cretaceous formations pass over through Malta and Sicily to the Apennines. He also notes the general correspondence, in form and character, between the ranges of the eastern and western parts of the Atlas system, of South-Eastern Spain and of the Apennines, respectively. The whole Atlas region has a definite southern boundary formed by the Wady Draa to the west and the Wady Jedi and Shotts depression eastwards. South of this line the geognostic conditions are markedly different.

A travers le Royaume de Tamerlan (Asie Centrale) : Voyage dans la Sibérie occidentale, le Turkestan, la Boukharie, aux bords de l'Amou-Daria, à Khiva et dans l'Ouest-Ourt. Par GUILLAUME CAPUS, Docteur ès-Sciences, etc. etc. Illustré de 66 gravures par PAUL MERWART, d'après les documents de l'auteur. Avec 2 Cartes. Paris : A. Hennuyer. Pp. xvi. + 434.

The only adverse criticism which could be brought against this work is that it did not appear sooner ; for the journey which it describes was performed in 1880, and in these days, even in Central Asia, twelve years bring their changes. Russian influence has not been standing still, and outside of politics we should have liked to know, for instance, what results have followed their schemes for arresting the invasions of the sand in the region between Bokhara and the Oxus, or to hear something more regarding the ancient channel of that river.

The volume, however, is full of interest, and the writer's clear, incisive, and often picturesque style also conduces to make it very agreeable reading. Even the fact that much of the country traversed has already been dealt with by M. Bonvalot (who was the writer's companion on this journey), does not lessen the interest of the narrative, for M. Capus is a competent geologist, and his description of the natural features of the country and the character of the landscape in their relation to its geology is especially valuable. His notes on natural history are also of much interest. In speaking of the vast deposits of löss which occur here as in parts of China, he doubts whether Baron von Richthofen's theory, which, as is well known, pronounces the löss to be a sub-aërial deposit, can apply to Turkestan. Here, on approaching the granitic and syenitic mountains from the plain, the material becomes coarser and less decomposed, and forms a granitic sand, with crystals of felspar, which have not yet been disintegrated into a clayey substance ; all this

would appear to point rather to aqueous than to aërial action. But this subject the author proposes to treat in a special paper.

Among many other topics of interest to which we can only allude, we may note an observation on the lake, Iskandar Kul, which drains into the valley of the Zerafshan. The author considers that, in Central Asia at all events, a lake under these circumstances has a valuable regulating effect on the stream which flows from it, preventing extremes of flood or drought, a matter which, of course, is of great importance to the dwellers in its valley. So strongly convinced is he of the correctness of this view, that he believes it would be well worth while to create artificial lakes by damming up some of the more turbulent streams near their sources.

As regards the illustrations, we cannot but commend the honesty which tells us that they are prepared at home, "d'après les documents de l'auteur."

A Footnote to History: Eight Years of Trouble in Samoa. By Robert Louis Stevenson. London, etc.: Cassell and Co., 1892. Pp. 322. *Price* 6*s.*

Although this is in no sense a geographical work, still, in describing the hostile operations on both sides, it tells us incidentally a good deal about the topography of the country immediately around Apia. The book contains a narrative, which the author seems to have done his best to make impartial, of the events of the last few years in Samoa. The root of all the disturbances was, according to Mr. Stevenson, the high-handed and unscrupulous conduct of the great "Handels-und-Plantagen Gesellschaft," backed by the local German officials. Their action, indeed, if not the policy that led to it, was disavowed frankly, if late in the day, at Berlin. Matters are, however, as yet far from settled, and this is not the place to discuss the details of questions still burning. The author, as might be expected, is keenly alive to the picturesque as well as to the humorous elements of the situation, which he describes in a telling and incisive style, with all the skill in grouping the salient points of his story of which he has shown himself a master in his works of fiction.

Not the least interesting part of the book is the light it throws upon native character—the combination, for instance, of much shrewdness and cleverness with childish recklessness, which makes the Samoans incapable of holding their own against the white man.

Where shall we Go? a Guide to the Watering-Places and Health-Resorts of England, Scotland, Ireland, and Wales. Edited by A. R. Hope Moncrieff. Twelfth edition. London and Edinburgh: A. and C. Black, 1892. Pp. xxv.+348.

The fact that this compact little volume has reached its twelfth edition shows plainly enough that it is widely recognised as a trustworthy guide to the health and pleasure resorts of the United Kingdom. The first 239 pages are devoted to the watering-places and holiday-resorts of England; the next 18 to those of Wales. The description of those of Scotland occupies about 170 pages, while the remainder of the volume relates to the holiday-resorts of the sister kingdom.

The volume is illustrated by folding maps of England and Wales, of Scotland, and of Ireland, which are printed in a style sufficiently clear for the general purpose for which they are intended.

Mediæval England (Periods of English History): From the English Settlement to the Reformation. Edited by W. Scott Dalgeish, M.A., LL.D. London, Edinburgh, and New York: T. Nelson and Sons, 1892. Pp. viii. + 276. *Price* 2*s.*

This volume is the first of three which are intended to cover the course of English history according to periods fixed by the Oxford and Cambridge Local

Examination schemes, and by other authorities. The idea of division is to be commended educationally, if the teacher but takes the trouble to give to his pupils beforehand, by way of introduction and preliminary interest, a rough but intelligent and intelligible sketch of our whole history, particularly of the political and social development of England. The present volume deals, according to the preface, with "Feudal Monarchy"—a term which requires to be defined carefully, here limited and there extended, to suit different epochs within the general period: a term, in fact, as applied to English history, apt rather to mislead by what it suggests than to instruct. The merits of this work are the orderly arrangement of facts in a lucid style, and a generally accurate interpretation of their more immediate bearing: more attention than is usual in books of the kind to social and constitutional progress; handy maps and plans; a useful chronological summary of the constitution and leading parliamentary measures; and a glossary of historical terms. These merits raise the book above the level of ordinary elementary manuals (of which there are too many); but a certain failure to indicate general lines of progress, to grasp connections and continuity, to seize and represent causes and effects (the very essence of history) must unfit it, in its present state, for use in the higher forms of our better secondary schools. Thus, the writer hardly grasps the underlying causes of the Wars of the Roses (the "want of governance" and all implied therein), nor does he disclose their important consequences, political, social, and economic; and, in spite of the stress intended to be laid on constitutional development, we are given rather a summary of detached constitutional facts than a reasoned picture of constitutional fortunes and progress. Similarly, Dr. Scott Dalgleish should have made quite explicit the stages in the Danish invasions, the events and conditions leading up to *Magna Carta*, the *national* aspect of the reigns of Henry II. and Edward I., the original cause of the Hundred Years' War and the causes of its outbreak at successive stages. Some inaccuracies have crept into the work. Thus, Paulinus was ordained at York in 625 (not 627 as on page 30); the date of the foundation of Kent is given as 457 on p. 27, and as 449 on p. 30; in the map on p. 31 the Danelagh is strangely located, and Offa's Dyke is not continued far enough; the Church was a unifying force, but did *not* succeed in unifying England (p. 32); Offa was king from 757 to 796, not from 758 to 794 (p. 34); the date of Hengest's Down is better given as 837 than 835 (p. 36), especially as Egbert's death is assigned to 839. The title of Edward the Elder is not "King of England" (p. 40), but "King of the English:" *Rex Anglorum*, not *Rex Angliæ*, which dates from John. The restrictions on the law of primogeniture in the English kingship are made too sweeping (p. 41). The battle of Assandun, the decisive fight for rule between Dane and English, should be mentioned. Some careful revision appears to be needed.

Trophies from African Heathenism. By Robert Young, F.R.S.G.S. London: Hodder and Stoughton, 1892. Pp. 216. Map and Index.

This small volume deals with various subjects connected with missionary enterprise in South Africa; and the author, in addition to making the personal acquaintance of many South African missionaries, has visited many of the mission stations of various Churches and Societies. He appears to be most intimately acquainted with the missions of the Free Church of Scotland. There is nothing of geographical importance in the volume, but it can be recommended to all friends of missions; and the author's remarks on the liquor traffic are of importance, and should be borne in mind by all interested in civilisation in that part of the world.

Famous British Explorers and Navigators from Drake to Franklin. By Richard Rowe. London: Charles H. Kelly, 1892. Pp. 240. *Price* 2*s.* 6*d.*

As Mr Rowe has closely followed the original authorities and writes in a spirited, and consequently interesting, style, this volume of biographical sketches should form a capital book for young people, likely to awaken in them an interest in foreign countries, and thus stimulate a taste for geographical studies. The narratives, although much condensed, are full enough for the purpose which they are intended to meet, and the illustrations, although somewhat rough, are numerous. We are inclined to think that the additions of an index and of a good map of the World would have been improvements; but, altogether, the volume has our commendation.

Recent Explorations in Bible Lands. By the Rev. Thomas Nicol, B.D. 76 pp. 1 Map. Edinburgh: George Adam Young and Co., 1892. *Price* 1s.

This is a reprint of a supplement to the sixth revised edition of Dr. Young's *Analytical Concordance to the Bible*, contributed by the minister of the Tolbooth Parish, Edinburgh. It is a clear and brightly written summary of the results of the latest explorations in the East, so far as they bear on the history of the Hebrews. The order of the Bible narrative is adopted, and an interesting chapter is devoted to each of the leading events that have been made more real to us by recent discoveries. The little book forms a good primer for those beginning the study of these wonderful revelations of past ages. An excellent map by Messrs. Bartholomew is a most useful adjunct.

Meyers Konversations-Lexicon. Band xix. Jahres-Supplement, 1891-92. Vierte, gänzlich umgearbeitete Auflage. Leipzig und Wien: Bibliographisches Institut. 1892. Pp. xiv+1018. *Price* 10 *Mark.*

The first *Heft*, or part, of this volume has been already briefly noticed (see p. 396 of the present volume). The nature and scope of the book will be sufficiently indicated by a reference to our remarks in that place, combined with a further reference to our notice of vol. xviii., the supplementary volume of the same encyclopædia for the year preceding (see vol. vii. p. 511). In respect of the contents, there is the usual complement of geographical articles to be expected in a volume of this kind, containing the newest available information (*e.g.* on British North Borneo), and characterised by the thoroughness and accuracy we are accustomed to look for, and to find, in "Meyer."

The Maritime Provinces of Canada. A Handbook of General Information. 14 Illustrations and Map. Pp. 122. 1892.

Nova Scotia, New Brunswick, and Prince Edward Island have not hitherto attracted so much attention as the other provinces of the Dominion of Canada. Now, however, it seems that interest is being aroused in these maritime districts, and the High Commissioner for Canada has done well to publish this handbook, which gives full information as to the country, its prospects, the fertility of the soil, trade and manufactures, climate, the regulations of the land, and the methods of obtaining farms, as well as comprehensive advice for intending emigrants, etc.

It appears that the rates of wages are, on an average, 20 to 40 per cent. higher than in Great Britain, and that there are better openings for exceptionally good craftsmen in the Dominion than at home.

The Statistical Year-Book of Canada for 1891. By SYDNEY C. D. ROPER. Published by the Department of Agriculture, Ottawa. Pp. 564, and Index.

This, the seventh issue of the *Statistical Year-Book of Canada*, contains many improvements on previous years. The chapters on trade, commerce, and agriculture have been considerably enlarged, and new tables have been added, as well as much useful information bearing upon the important trade questions of the day. The population has increased by some 500,000 since 1881, being now 4,832,679. The immigration in 1891 was 82,165; the revenue was 38,579,311 dollars; the expenditure, 36,343,568 dollars. The volume has been compiled with evident care.

Tasmanian Official Record, 1892. By R. M. JOHNSTON, F.L.S. Tasmania: Strutt, 1892. Pp. 489. Index and Maps.

For an accurate and concise description of Tasmania, dealing with its early history, physical description, natural resources—mineral, animal, and vegetable—constitutional government, and Crown lands available for selection, as well as meteorology and vital statistics, Mr. Johnston's work may be consulted with advantage. The volume contains also an immense amount of statistical information, illustrated by carefully prepared charts. The index is very complete, and the tariff of Tasmania is given in full.

Sketches of Durban and its Harbour in 1891. By CATHCART W. METHVEN, M. Inst. C.E., F.R.S.E., Engineer-in-Chief, Natal Harbour Board. Durban: P. Davis and Son, 1891. Pp. xv. + 35.

This is an admirable album of sketches, calculated to give one a very full and satisfactory idea of what the town of Durban and its harbour are at the present day. The brief introductory pages contain a short historical account of the place, with valuable and instructive statistics. The general get-up of the whole volume deserves a word of the highest praise, and the publishers are to be congratulated on their part of the work. We have seldom seen a better-produced book from any of our colonies.

Paraguay: the Land and the People; Natural Wealth and Commercial Capabilities. By Dr. E. DE BOURGADE LA DARDYE. London: George Philip and Son, 1892. Pp. 243. *Price 7s. 6d.*

In the number of this *Magazine* for February 1891 we reviewed the original work, of which the volume before us is a translation. We then gave a summary of its contents, and expressed the high estimate we had formed of its merits. We found it to be replete with most valuable information regarding the physical features and the rich natural products of the interesting regions which it described, and to contain besides multitudinous details regarding the economic, social, and political condition of the races by which the soil was occupied. This information, collected, as it had been, by a scientific observer who had spent two years in exploring the country, appeared to us to be such as might be turned to good practical account by our own countrymen, who had supplied nearly all the very considerable amount of capital which had been employed in the construction of railways and in promoting other enterprises for developing the resources of the country. We therefore expressed a wish that M. Bourgade's work might speedily be reproduced in English. The handsome volume now under notice supplies in the most adequate manner what we then desiderated. It is edited by Mr. Ravenstein, of the Royal Geographical Society, and his name alone is a sufficient guarantee that

the translation is all it should be. It contains reproductions of all the illustrations with which the original work was adorned, as well as a reproduction of the map, which is one of the highest value, as it corrects the numerous mistakes by which all the previously existing maps of Paraguay were vitiated. The appendices contain valuable matter which is not found in the original work.

The Forest Cantons of Switzerland: Lucerne, Schwyz, Uri, Unterwalden. By J. Sowerby, M.A. Pp. viii.–288. Map. London: Percival and Co., 1892. *Price 3s. 6d.*

Any visitor who intends to spend more than a few busy hours at the Lake of Lucerne cannot do better than pack this book in his portmanteau. No matter what his interests may be, he will find some information relating to them. Part of the book contains fuller descriptions of Lucerne, the Rigi, Pilatus, Schwyz, St. Gothard, etc., than he will find in *Murray* or *Baedeker*. Should he wish to study the rocks, the plants, or the animals in the district, he will find clearly written notes about them; also a chapter on topography, and one on Alpine exploration. The internal and external history of the Four Forest Cantons is discussed in all its aspects an account is given of the people themselves, their manners, customs, and traditions, their language and literature, as well as their occupations; and a chapter is devoted to the more famous men. At the beginning a lithographed map, drawn by Mr. Sowerby on a scale of 1 inch to $4\frac{3}{4}$ miles, is inserted, in which the longitudes are reckoned from the Paris meridian! The book is full of information clearly arranged. It may be called a guide-book of a superior sort, for the use of those who wish to see more than a hurried glimpse of this beautiful and interesting region, the birthplace of Swiss independence.

The Landquart-Davos Railway [Nos. 133, 134]. By J. Hauri, Pastor. 60 pp.

The Kuranstalt W. J. Holsboer [No. 135]. Grand Hôtel, Kurhaus Davos. 35 pp.

The Kursaal Maloja, in the Upper Engadine and its Environs [Nos. 143, 144]. By Wilh. Altenburg. 51 pp.

The Vosges Mountains [Nos. 139, 140, 141, 142]. By Fritz Ehrenberg. 137 pp.

These four little books belong to the well-known *Illustrated Europe* series of guide-books, published by Orell, Fussli, and Co., Zurich, and are profusely illustrated with good engravings.

The Landquart-Davos Guide has a short account of the railway, and of the history of the region through which it passes; it then gives a more detailed notice of the various places of interest to be seen as the railway passes from the Rhine valley through the interesting Swiss Alpine valley of the Prättigau, to the health-resort of Davos. The book concludes by indicating the various excursions that can be made from Davos as a starting-place.

The Kuranstalt Holsboer comes as a sort of sequel to the *Landquart-Davos Railway*, seeing that it describes one of the chief curative establishments in the Davos region. Judging by the account given here, every endeavour has been made to provide for the comfort and amusement of the invalids frequenting the establishment. Appended is a scale of charges and a short article on "Indications for and against Davos in cases of chronic lung-trouble," that may be of use to medical men and their patients.

The Kursaal Maloja deals with another Alpine hydropathic, situated in the Upper Engadine, facing the lake of Sils. Special attention has been given to sanitary arrangements, and the establishment is lit up by electric light, in connec-

tion with which is a generator of ozone. The book gives an account of the history and the climate of the Upper Engadine. At the end there is a "Tariff for Mountain Tours from Maloja," as well as a plan of the hotel and a map of the surrounding district.

The fourth guide-book is prepared by a Strasbourg *littérateur* for the Association of Hotel Proprietors of the Vosges. The principal places on the German side of the Vosges between Strasbourg and Mülhausen are described, and the most interesting and picturesque excursions from them. More space is devoted to the smaller villages than to the large towns. Full information is given about hotels in the hands of members of the Vosges Association, and others are mentioned. The details of the routes to various hill-tops and sights seem very satisfactory; and when conveyances or horses can be used, the rates of hire are given. An outline map of the district is appended.

All these guide-books are excellently printed and illustrated, and are very cheap at 6d. per number.

Craigmillar and its Environs. With notices of the Topography, Natural History, and Antiquities of the District. By Tom Speedy. Selkirk: George Lewis and Son, 1892. Illustrated.

This is an interesting monograph on Craigmillar and its surroundings, from the pen of Mr. Tom Speedy. Mr. Speedy has qualified himself for the office of historian of the Castle by a long residence on the estate; while his knowledge of natural history and his antiquarian lore render the chapters on the fauna, botany, and geology of the district instructive as well as interesting. The story of the Castle, from the time of Henricus de Craigmillar, during the tenure of the Prestons, the imprisonment of Mar, and its occupation by the ill-fated Mary Stuart, to its reversion into the hands of the Gilmours, the present owners, is told in a sprightly and readable way. The photogravures and the landscape woodcuts form an additional attraction to the volume. The natural history pictures, however, are of a different stamp, and strike one as rather antiquated, though not wanting in effect.

The Glasgow Series of Elementary Geography. By Lionel W. Lyde, M.A. (1) British North America; (2) New Zealand and Tasmania. London Percival and Co., 1892.

The editor of this new series has formed an excellent conception of how geography should be taught, and of what an elementary course should comprise. He lays down two guiding principles, both of which are theoretically sound. The one is to aim at giving information that will interest the scholar, or, as Mr. Lyde rather ambiguously expresses it, information that "is calculated to rouse interest and pride in the countries described." The second principle is to present that information "in such a way as to appeal to the reason, not to the memory.' That is expressed, perhaps, too absolutely. It is impossible to make any progress in geography without utilising the memory The old system of teaching relied too much on memory, and put too great a strain upon it; but the tendency of the new system is to go to the opposite extreme, and to use the memory too little. Memory is a most valuable faculty, and geography, when judiciously utilised, affords one of the best means of exercising and training it. Instead, therefore, of putting reason and memory in opposition, we should prefer to place them in conjunction, and to say that the aim of the teacher of geography should be, not to exalt the reason at the expense of memory, but to appeal to memory through the reason. That is, in fact,

though he scarcely seems to be aware of it, what Mr. Lyde has done in these excellent little books of his. He gives the right kind of information; but he gives it in a reasonable form, thereby rendering it easy to remember. It must also be said that the information he gives often assumes a good deal of previous knowledge on the part of the reader. For example, he says that "Champlain founded Quebec;" but who or what was Champlain? He adds that "the systematic colonisation of 'New France' was begun;" but what was New France? He says that the climate of Canada is "continental," thus assuming that the reader knows the difference between a "continental" and an "insular" climate; and that can scarcely be described as an appeal to the reason, to the exclusion of memory. It must be admitted, at the same time, that these books are, in many respects, superior to the ordinary text-books of geography. Their method is, on the whole, good, and their information is fresh, full, and satisfying; but the maps cannot be commended.

Philips' Geographical Manuals. The Geography of Australia and Polynesia. By J. Francon Williams, F.R.G.S. London: George Philip and Son, 1892.

This is an exhaustive and methodically arranged compendium of the geography of Australasia and Polynesia. It proceeds on the old, familiar, and well-worn lines. It bristles with facts, names, and figures, which are rather monotonous reading. From the fact that it begins on page 677 and ends on page 799, it evidently forms a section of a general geography of the world. Its 122 pages, most of them in very small type, contain a vast amount of information, generally accurate, though not always entertaining, and appealing to the memory rather than to the reasoning faculty of the student. The coloured maps are clear and good.

Murby's Geography and Atlas, consisting of the "Elementary Geography for Schools," by A. H. Dick, D.Sc., M.A., LL.D., F.R.G.S. London: Thomas Murby.

Dick's *Elementary Geography* had a good reputation in its day, though now it would be considered somewhat antiquated in its method and plan. In the present edition the old book has been revised and brought down to date in the matter of information: and it has been furnished with twenty-four coloured maps which cannot be praised as works of art.

Physiography: Advanced Course. By the late Andrew Findlater, M.A., LL.D. New Edition by David Forsyth, M.A., D.Sc. London and Edinburgh: W. and R. Chambers, 1892.

In this book the late Dr. Findlater's admirable text-book of Physiography has been thoroughly revised and brought abreast of the present state of knowledge. The lessons are adapted to the syllabus of the South Kensington Science Department. The illustrations, which are abundant, are well drawn and clearly printed; and the whole of the educational machinery of the book is excellent.

The Health Resort of Franzensbad, Bohemia (with 47 illustrations by J. Weber), with a Map. *Illustrated Europe*, Nos. 145, 146, 147. Zürich: The Art Institute Orelli-Füssli.

This pamphlet sets forth, in a very attractive manner, the claims of the famous Bohemian Spa of Franzensbad as a health-resort. The pictures are very attractive, and the analytic tables exhibit the advantages of the several springs, of which there are at least twelve.

NEW MAPS.

EUROPE.

SCOTLAND, New Reduced Ordnance Survey Maps of ——. Sheets Nos. 10 and 25. *John Bartholomew & Co., Edinburgh.*

Messrs. John Bartholomew have lately issued two new sheets of their reduced edition of the Ordnance Survey Maps of Scotland. Sheet 10 embraces the whole of Mull, Iona, Coll, and Tiree, and includes Morven and Loch Sunart on the north, and the Gulf of Corrievrechan on the south. The steamboat routes and the main roads are clearly distinguished, and the map is tinted so as to show the 500 feet intervals of the contours.

Sheet 25 of the same series extends from the coast at Berriedale on the north, past the Dornoch Firth, southward to Cromarty, and inland as far as Loch Shin and Strath Rannoch. For almost all general purposes these beautiful maps are the very best that can be had.

NORTH LONDON, W. H. Smith & Son's Plan and Guide to ——.
By J. Bartholomew, F.R.G.S. Price 2s.

The name of Bartholomew on this plan is a sufficient guarantee for the excellence of its workmanship. The district covered extends from Blackfriars Station northwards to Tottenham Park, and from Stratford to Kensal Green. Judicious colouring clearly distinguishes railways and omnibus and tram routes, and the spaces occupied by parks, squares, and reservoirs. The printing is clear and neat, and the general effect very satisfactory.

ASIA.

INDIA, Indexed Map of British ——. *Rand, M'Nally & Co.'s Indexed Atlas of the World.*
Rand, M'Nally & Co., Chicago and New York, N.D. *Price 3s. 2d.*

This map of India on serviceable paper measures about 19 by 26 inches, and folds into a cover 6 by 3½ inches. The scale is about 72½ geographical, or 83½ English miles, to an inch. The index is printed on the back of the sheet in nonpareil type, and contains about 2500 names, with the populations of a considerable number of towns. Without expecting extreme accuracy in the engraving, we are rather disappointed with the selection, as well as the spellings, of the names. Dharwar, the chief town of a large district, and a railway station, is omitted; so is Attok; Karjat is made into *Karat*; Elephanta is placed to the *south* of Bombay, and similar inadvertencies occur all over the map. An inset gives Burma and the Andaman Islands on about two-thirds the scale of the larger map.

AFRICA.

CENTRAL AND SOUTH AFRICA, New Map of ——.
John Bartholomew & Co., Edinburgh. Price 2s.; cloth, 3s.

This new map is similar in style to those previously published by the same firm. It is corrected up to October 1892, and shows the latest alterations in the political boundaries—as, for instance, in Lunda, the Barotse country, and the region of the Zambesi. A few physical changes also appear: the outline of Lake Bangweolo differs from that on earlier maps, one or two smaller lakes are added to the north of Victoria Nyanza, and Mfumbiro is removed to its proper position within the territory of the Congo State.

CHARTS.

ABREOJOS ANCHORAGE AND VICINITY, West Coast of Lower California. Nov. 1891. No. 1294.

CERROS ISLAND TO ABREOJOS POINT, West Coast of Lower California. March 1892. No. 1310.

THE WEST INDIES, with the Gulf of Mexico and Caribbean Sea. Compiled from the latest information. June 1892.

Hydrographic Office, Navy Department, Washington. Richardson Clover, Lieut.-Commander, U.S. Navy, Hydrographer.

ATLASES.

SCHWEIZ, Topographischer Atlas der ——, im Massstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868 durch das eidg. topogr. Büreau gemäss den Direktionen von Oberst Siegfried veröffentlicht.

Lieferung XL. : —

No. 259, Euthal.	No. 372, Schüpfheim.	No. 459, Dent de Brenleire.
„ 261, Iberg.	„ 374, Escholzmatt.	„ 461, Château d'Oex.
„ 292, Orbe.	„ 377, Stans.	„ 476, Bex.
„ 305, Sottens.	„ 380, Buochs.	„ 543, Melide.

THE UNIVERSAL ATLAS, complete in 28 parts, including Index. Published by Cassell and Co., Limited, London, for the Atlas Publishing Company, Limited. Parts XV., XVI., XVII., and XVIII.

Part XV. contains two double-page maps—the North Polar Regions, with insets of Novaya Zemlya, Spitzbergen, South-West and East Greenland, on larger scales, and the North-Western portion of Africa, which has been carefully brought up to date. Part XVI. consists of the Mediterranean Sea (east and west), and a double-page map of Northern India. This is an entirely new map, and has been specially prepared for the English edition ; it is clearly drawn, and Sir W. W. Hunter's spelling has been adopted. Part XVII. is occupied by a double-page map of North America, a map of the Grand-Duchy of Baden, and an ethnographic map of Austria-Hungary. Part XVIII. includes a double-page map of North-East Africa and the two southern sections of the special map of France.

HISTOIRE ET GÉOGRAPHIE, Atlas Vidal-Lablache, Maître de Conférences de Géographie à l'école normale supérieure. 24 Livraisons. 137 Cartes—248 Cartons. Index alphabétique de plus de 40,000 noms. Livraisons, 11-14.

Paris: Armand Colin et Cie., Éditeurs.

NEW PHOTOGRAPHS.

FRANCE, ITALY, AND SWITZERLAND.—We have received from Mr. James Jackson, of the Paris Geographical Society, 107 new photographs taken by himself in the south of France—many of which are of geological interest—5 in Italy, and 4 in Switzerland.

AUCKLAND ISLES.—Baron Ferdinand von Mueller, K.C.M.G., has presented to the Society an album of 24 photographs, taken by the German Transit of Venus Expedition in 1874.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

REPORT OF COUNCIL.

Eighth Session, 1891-92.

The Council has the honour to submit the following Annual Report on the Session.

Membership.

The following Statement shows the gains and losses in number of Members during the Session :—

Number on 31st October 1891,		1495
New Members elected,		87
		1582
Deduct Deaths,	16	
„ Resignations,	91	
	—	107
Number of Members remaining on 31st October 1892,		1475

This number is made up as follows :—

Edinburgh,	815
Glasgow,	313
Dundee,	81
Aberdeen,	68
English,	144
Foreign,	54
	1475

Of the above, 171 *are Life Members.*

The remarks made in last year's report regarding the excess of losses over gains in the number of Members are applicable to the present Session. The net decrease is 20.

The Council is again indebted to the Conveners, Honorary Secretaries, Treasurers, and Members of the Branch Committees in Glasgow, Dundee, and Aberdeen for the manner in which they have promoted the interests of the Society.

Diplomas of Fellowship.

The Council, acting on the recommendation of the Education Committee, has conferred the Honorary Diploma of Fellowship on the following gentlemen :—

The Right Honourable Lord Lamington.
H.S.H. Albert, Prince of Monaco.
Thomas Muir, M.A., LL.D., F.R.S.E.
A. Silva White, F.R.S.E.

Diplomas of Ordinary Fellowship were also conferred on the following eight gentlemen, viz. :—H. N. Dickson ; Mathew H. Speedie ; R. S. Hynde ; David C. Thomson ; J. W. M'Crindle, M.A. ; A. C. Macdonald ; Thomas Prentice ; and Henry Chancellor.

Finance.

The Council submits the following Financial Statement :—

ABSTRACT OF THE ACCOUNTS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

From 31st October 1891 *to 31st October* 1892.

FUNDS AT THE CLOSE OF LAST ACCOUNT:—							
£1000 Glasgow and South-Western Railway 4 per cent. Funded Debt, cost, 29th May 1885,						£1102	19 9
£400 North British Railway 4 per cent. Consolidated Lien Stock, cost, 30th December 1890,						496	2 0
						£1599	1 9
Cash in Bank of Scotland, Edinburgh, in Account Current,				£138	17 11		
Add: Due by Secretary,			£12	6 6			
Less.— Due to Honorary Treasurer,			0	17 0			
					11 9 6		
						150	7 5
						£1749	9 2
ENTRANCE FEES, 83 at £1, 1s.,					£87 3 0		
ORDINARY SUBSCRIPTIONS:—							
20 Life Members, at £10, 10s.,					210 0 0		
4 Annual Subscriptions of £1, 1s. for year 1888-89,			£4	4 0			
8 Do.	Do.	1889-90,	8	8 0			
54 Do.	Do.	1890-91,	56	14 0			
1190 Do.	Do.	1891-92,	1249	10 0			
17 Do.	Do.	1892-93,	17	17 0			
					1336 13 0		
FEES received for Society's Diploma, 8 at £1, 1s.,					8 8 0		
SUMS received under the Society's Scheme for the encouragement of Geographical Education,					27 15 0		
PROCEEDS OF MAGAZINES sold,					187 2 7		
DIVIDENDS and BANK INTEREST,					58 2 6		
RECEIPTS from Loan of Maps,					1 11 6		
SUBSCRIPTIONS received for 'HAUSA FUND,'					19 3 0		
						1935	18 7
						£3685	7 9

MAGAZINES, Printing, Paper, Lithographing, etc., from Nos. 8 to 12 of Vol. VII., and 1 to 8 of Vol. VIII., all inclusive, and for Postage,						£877	18 7
Less: Received during the year for Advertising,						72	0 0
						£805	18 7
GENERAL PRINTING,						76	5 3
BOOKS and other Furnishings for Library,						32	7 0
RENTS OF HALLS, and other expenses of Lectures,						41	18 7
RENT OF COUNCIL ROOM, Taxes and Gas, Repairs, Insurance, etc.,						179	4 3
SALARIES:—							
To *Secretary*, year to 31st October 1892,				£313	17 9		
,, *Assistant Librarian and Clerks*,				184	12 0		
						198	9 9
EXPENSES connected with Society's Education Scheme,						37	16 7
EXPENSES of Reception to British Association,						43	2 6
MISCELLANEOUS, including Stationery, Wages to Officer, Porter, Messenger, General Expenses, Advertising, Cleaning, Bank Charges, Postages, and Office Furniture, including Expenses connected with starting of London Branch,						259	16 1
SUBSCRIPTIONS for 'HAUSA FUND' paid over,						19	3 0
						£1994	1 7
FUNDS AT CLOSE OF THIS ACCOUNT:							
£1000 Glasgow and South-Western Railway 4 per cent. Funded Debt, cost, 29th May 1885,					£1102	19 9	
£400 North British Railway 4 per cent. Consolidated Lien Stock, cost, 30th Dec. 1890,					496	2 0	
					£1599	1 9	
Cash in Bank of Scotland, Edinburgh, in Account Current,			£82	11 7			
Due by Secretary,		£6	10	10			
Do. Hon. Treasurer,		3	2	0			
		9	12	10			
					92	4 5	
						1691	6 2
						£3685	7 9

Edinburgh, 7th November 1892.—I have examined the Accounts of the Royal Scottish Geographical Society for the year ending 31st October 1892, of which the above is an Abstract, and compared them with the Vouchers and Instructions thereof, and find the same correct and sufficiently vouched.

HUGH BLAIR, C.A.

The above Abstract of the Accounts exhibits the funds at the close of the year as amounting to £1691. 6s. 2d. The Council takes this opportunity of expressing its obligations to Mr. James M. M'Andrew, C.A., who has acted as Honorary Auditor since the Society was first organised, but has now resigned the office. His successor in business, Mr. Hugh Blair, C.A., has kindly consented to undertake the Audit.

Meetings.

During the Session 23 meetings were held, of which 10 were in Edinburgh, 6 in Glasgow, 3 in Dundee, 2 in Aberdeen, and 2 in London. The papers read at these meetings were contributed by Mrs. Bishop, Lord Lamington, Dr. H. R. Mill, Mr. J. Graham Kerr, Mr. Mounteney Jephson, Professor Cargill G. Knott, Mr. Henry M. Cadell of Grange, Professor James Bryce, LL.D., M.P., Dr. H. Martyn Clark of Amritzar (Punjab), and Professor James Geikie.

Education Scheme.

Two courses of lectures were organised last winter :—One by Professor Geikie on "The Origin of Surface Features," and the other by Dr. H. R. Mill on "Air and Sea : a Sketch of Meteorology and Oceanography." The success of both courses was very gratifying, Professor Geikie's lectures having been attended by 89, and Dr. Mill's by 72, students. Encouraged by this success, the Council has arranged for two courses of lectures during the coming winter, namely, one by Mr. J. G. Goodchild on "Volcanoes," and a second by Mr. J. Arthur Thomson on "The Distribution of Plants and Animals."

The Society's Magazine.

The Magazine has been conducted to the satisfaction of the Council, which desires to express its obligations to the writers of signed articles, as well as to the lady and gentlemen whose names are given below, who, amongst others, have materially aided the editors :—Mrs. Silva White ; Dr. W. Scott Dalgleish ; Ralph Richardson, Esq. ; John Gunn, Esq. ; Dr. Hugh R. Mill ; D. Playfair Heatley, Esq. ; Charles Robertson, Esq. ; Fr. Bosse, Esq. ; Dr. R. W. Felkin ; J. T. Bealby, Esq. ; Dr. G. Dods ; Professor Cargill G. Knott ; Dr. George Smith ; Dr. James Burgess ; Coutts Trotter, Esq. ; Principal Grant Ogilvie ; Professor James Geikie ; J. G. Bartholomew, Esq. ; General Sir R. Murdoch Smith ; J. G. Goodchild, Esq. ; Dr. Traquair ; C. E. D. Black, Esq. ; J. W. M'Crindle, Esq. ; J. Graham Kerr Esq. ; Dr. Symington.

Library and Map Department.

The following additions were made during the Session to the stock of books and maps :—Books and pamphlets, 639 ; atlases, 15 ; map-sheets, 387 ; being an increase of 41 books and pamphlets, 6 atlases, and 163 map-sheets over the figures of the previous twelve months. The number of periodicals on the exchange list has increased by 7, and now stands at 121.

The number of volumes lent out to members was 1503, as compared with 1173 during the previous Session, showing that interest in geographical subjects is increasing.

The expenditure incurred was £32, 7s. 0d.

The Council desires to express its obligations to the various Foreign and Colonial Governments who have sent the Society their official publications; and to the following amongst other private donors:—J. G. Bartholomew, Esq., W. B. Blaikie, Esq., Dr. James Burgess, Dr. Hugh F. C. Cleghorn, John Geddie, Esq., Lord Lamington, Dr. John Murray, and James Smiles, Esq.

Place-Names Committee.

The Place-Names Committee has formed parochial committees, in the districts under investigation (parts of Argyllshire), consisting, usually, of the Minister and a few other persons well acquainted with the localities. The Council's Committee prepares lists of the names of all places in each parish, as found on the Ordnance Survey maps, and sends this list, with full directions, to the Local Committee for revision; when the revised list is returned to the Convener, he compares the altered spellings with those found in the Register of Voters, and submits the result to the Committee.

The first list returned was that for the parish of Kilchoman in Mull: it contained 992 place-names, the discussion of which occupied the Committee during four sittings, every word being carefully considered, and the correct spelling decided on. The result showed that the Kilchoman Committee had discharged its duties in a most creditable manner.

The revised lists for Kilarow and Kilmeny, in Islay, are now awaiting discussion by the Council's Committee; that for Jura is in the hands of the Local Committee, and other lists are under preparation.

Exploration.

Mr. J. D. Rankin has returned from his explorations in the Loangwa-Zambesi basin. His report and map have been published in the November Number of the Society's Magazine.

London Branch.

In the early part of the Session, the Council, at the request of the members of the Society resident in London and the neighbourhood, agreed to institute a Branch in London, in order that they might have the advantage of occasional lectures. Two most successful meetings were held; but, in view of certain privileges which the Royal Geographical Society of London has accorded to members of this Society, the Council has resolved to withdraw this Branch.

Resignation of Mr. A. Silva White, and Appointment of a New Secretary.

The Society has lost the valuable services of Mr. A. Silva White, its Secretary and Editor, who was compelled, in consequence of the state of his health, to resign his appointment at the close of the Session. The Council, at a meeting held on 25th July, passed a Resolution expressing its deep regret at his resignation. (See the Society's Proceedings, published in the September Number.)

Lieut.-Col. F. Bailey, late Royal Engineers, has been appointed to succeed Mr. White.

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—— *Glasgow Elementary, of British North America* (Lyde), *rev.*, 673.
—— —— —— *of New Zealand and Tasmania* (Lyde), *rev.*, 673.
—— *Longmans' School, for South Africa* (Chisholm and Liebmann), *rev.*, 114.
—— *Modern, Advanced Class-Book of* (Hughes and Williams), *rev.*, 341.
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